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THE

PHYSIOLOGY AND PATHOLOGY OF THE MIND.

THE PHYSIOLOGY AND PATHOLOGY
OF THE MIND

THE

PHYSIOLOGY A[illegible]HOLOGY

OF [illegible]IND.

Dr.

BY

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PREFACE.

THE aim which I have had in view throughout this work has been twofold: first, to treat of mental phenomena from a physiological rather than from a metaphysical point of view; and, secondly, to bring the manifold instructive instances presented by the unsound mind to bear upon the interpretation of the obscure problems of mental science. Indeed it has been my desire to do what I could in order to put a happy end to the "inauspicious divorce" between the Physiology and Pathology of Mind, and to effect a reconciliation between these two branches of the same science. When I first applied myself, upwards of ten years since, to the practical study of insanity, having laid up beforehand some store of metaphysical philosophy, it was no small surprise and discouragement to find, on the one hand, that the theoretical knowledge acquired had no bearing whatever on, no discoverable relation to, the facts that daily came under observation, and, on the other hand, that writers on mental diseases, while giving the fullest information concerning them, treated their subject as if it belonged to a science entirely distinct from that which was concerned with the sound mind. This state of things could not fail to produce an immediate mental disquietude, and ultimately to give rise to the endeavour on my part to arrive at some definite conviction with regard to the physical conditions of mental function, and the relation of the phenomena of the sound and unsound mind. Of that endeavour the present work is the result. It can claim no more authority than what is due to a sincere purpose faithfully pursued, and to such truth as may be contained in it. The First Part, resting as it does mainly on the physiological method of inquiry into mental phenomena, will certainly not command the assent of those who put entire faith in the psychological method of interrogating self-consciousness; it must appeal rather to those who have made themselves acquainted with the latest advances in physiology, and with the present state of physiological psychology in Germany, and who are familiar with the writings of such as Professor Bain, Mr. Herbert Spencer, Dr. Laycock, and Dr. Carpenter, in this country. The Second Part of the book may stand on its own account as a treatise on the causes, varieties, pathology, and treatment of mental diseases, apart from all question of the proper method to be pursued in the investigation of mental phenomena. Even those who advocate the psychological method of interrogating self-consciousness do not insist on the application of it to the scientific study of the madman's mind.

In laying down the plan of this work, and in thus entering upon a task not before systematically attempted, I could not fail to experience the serious disadvantage, not only of having no guide to follow, but of being compelled by the scope of the work to deviate from the paths already made in metaphysics, physiology, and pathology respectively. In order to bring the results of the cultivation of these different branches of science into any sort of harmony, it was plainly necessary not to travel too far on paths which diverged more and more with every step forward. For this reason I have passed by many interesting questions which have long occupied a large space in metaphysics, and have deliberately omitted many discussions which were at one time intended to form a part of the book. In like manner, it seemed desirable, when treating of the physiology of mental action, to omit anatomical description of the nervous system, leaving the knowledge of it to be obtained in a more complete and satisfactory form from books specially dealing with the subject. Lastly, the pathology of diseases of the nervous system generally, although throwing much light on the pathology of mental diseases, could not find fitting place, and was after some hesitation sacrificed, in order to preserve the harmony of design, and to prevent the book growing to an immoderate bulk. Indeed, as may easily be conceived, it has been throughout far more difficult to determine what to leave out than what to put in, the proportion of material collected for the purposes of the project, but not directly used, exceeding that which has been actually used in its execution. I am fully sensible of the disadvantages resulting from these omissions: an amount of knowledge on the reader's part is taken for granted which he may not have, and without which many things may appear obscure to him, and many assertions unwarrantable. It may well be, too, that either the metaphysician, or the physiologist, or the pathologist, looking at the work from his particular standpoint, will see reason to pronounce it defective. Whosoever will, however, be at the pains to compare the discordant results of metaphysical, physiological, and pathological studies of mind, remembering that they are actually concerned with the same subject-matter, cannot fail to recognise and confess the uselessness of an exclusive method, and the pressing need of combined action and of a more philosophical mode of proceeding. If the work now offered to the public be successful in its aim, it will make evident how indispensable is the method advocated, and how full it is of promise of the most fruitful results.

In conclusion, I am glad to add a sincere expression of thanks to my friend Dr. Blandford, for his advice and assistance during the passage of the book through the press.

THE LAWN, HANWELL, W.
Feb. 6th, 1867.

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,, IX. Memory and Imagination.

THE
PHYSIOLOGY AND PATHOLOGY
OF THE MIND.

CHAPTER I.

ON THE METHOD OF THE STUDY OF MIND.

> "Ich sag' es dir: ein Kerl, der speculirt,
> Ist wie ein Thier, auf dürrer Heide
> Von einem bösen Geist im Kreis herum geführt,
> Und rings umher liegt schöne grüne Weide."
>
> *Faust.*

THE right estimate of his relations to external nature has ever been to man a matter of extreme difficulty and uncertainty. In the savage state of his infancy he feels himself so little in the presence of nature's vastness, so helpless in conflict with its resistless forces, that he falls down in abject prostration before its various powers. The earth of a sudden heaves beneath his trembling feet, and his shattered dwellings bury him in their ruins; the swelling waters overpass their accustomed boundaries and indifferently sweep away his property or his life; the furious hurricane ruthlessly destroys the labour of years; and famine or pestilence, regardless of his streaming eyes and piteous prayers, stalks in desolating march through a horror-stricken people. In the deep consciousness of his individual powerlessness he falls down in an agony of terror and worships the causes of his sufferings: he deifies the powers of nature, builds altars to propitiate the angry Neptune, and, by offering sacrifices of that which is most dear to him, even his own flesh and blood, hopes to mitigate the fury of Phœbus Apollo and to stay the dreadful clang of his silver bow. Everything appears supernatural because he knows nothing of the natural; palsied with fear, he cannot observe and investigate; himself he feels to be insignificant and helpless, while to nature he looks up with reverential awe as mighty and all-powerful. Reflect on the fearful feelings which any apparent exception to the regular course of nature even now produces, on the superstitious dread which of a certainty follows such unfamiliar event, and it will not be difficult to realize the extreme mental prostration of primitive mankind.

Through familiarity, however, consternation after a while subsides, and the spirit of inquiry follows upon that of reverence; the prostrate being rises from his knees to examine into the causes of events. Experience, sooner or later, reveals the uniformity with which they come to pass; he learns more or less of the laws of their occurrence, and perceives that he can by observation avoid much of the damage which he has hitherto suffered —that he can, by attending to their laws, even use to his profit those once dreaded physical forces. Now it is that man begins to feel that he has a much higher position in nature than in his infancy he had imagined; for a time he looks upon himself as belonging to the same order as the things around him; and he emancipates himself in great part from the dominion of the priests in whom he had hitherto believed as the sacred propitiators of the gods whom his fears had fashioned. When his creeds are seen to spring from an imperfection of the intellect, the prayers founded on them are abandoned as marking an imperfection of the will.

Thales of Miletus is said to have been the first who, in this advance amongst the Greeks, laid aside the priestly character and stood forth as a pure philosopher; and those who immediately followed him, and constituted the Ionian school of philosophy, having an instinctive feeling of the unity between man and nature, did seek objectively for a first principle of things—the ἄρχη—common to him and the rest of nature. This slow and tedious method was soon, however, abandoned for the easier and quicker method of deduction from consciousness: abstractions were made from the concrete by the active mind; and the abstractions, being then converted into objective realities, were looked upon and applied as actual entities in nature. Anaximander, looking into his own mind and finding an imbecility there, gave to it the name of the Infinite, and, transferring it outwards, was thenceforth quite content to pronounce it to be the true origin of all things; whilst Pythagoras, going perhaps still further into the unmeaning, proclaimed numbers, which are mere arbitrary symbols, to be actual existences and the essences of things. Thus it was that man, forgetful of his early humility, rose by degrees to the creation of the laws of an external world after the pattern of his own thoughts: such motives as he felt to influence his own actions were held also to be the principles governing the relations of external objects; and natural phenomena were explained by sympathies, loves, discord, hates. As the child attributes life to the dead objects around it, speaking with them and thinking to receive answers from them, so mankind, in the childhood of thought, assigns its subjective feelings to objective nature, entirely subordinating the physical to the metaphysical: it is but another form of that anthropomorphism by which the Dryad was placed in the tree, the Naiad in the fountain, Atropos with her scissors near the running life-thread, and a Sun-god enthroned in the place of a law of gravitation. As was natural, man, who thus imposed his laws upon nature, soon lost all his former humility, and from one erroneous extreme passed to the opposite: as once he fell abjectly down in an agony of fear, so now he rose proudly up in an ecstasy of conceit.

The assertion that man is the measure of the universe definitely expressed this metaphysical stage of human development. But it was a state that must plainly be fruitless of real knowledge; there could be no general agreement among men when each one looked into his own mind, and, arbitrarily making what he thought he found there the laws and principles of external nature, constructed the laws of the world out of the depths of his own consciousness. Disputes must continually arise about words when words have not definite meanings; and the unavoidable issue must be Sophistry and Pyrrhonism: the history of the human mind does, indeed, show that systems of scepticism have regularly alternated with systems of philosophy. Fruitful of empty ideas and wild fancies, philosophy has not been unlike those barren women who would fain have the rumbling of wind to be the motion of offspring. Convinced of the vanity of its ambitious attempts, Socrates endeavoured to bring philosophy down from the clouds, introduced it into the cities, and applied it to the conduct of human life; while Plato and Aristotle, opposite as were their professed methods, were both alive to the vagueness of the common disputations, and both laboured hard to fix definitely the meanings of words. But words cannot attain to definiteness save as living outgrowths of realities, as the exact expressions of the phenomena of life in the increasing speciality of human adaptation to external nature. As it is with life objectively, and as it is with cognition or subjective life, so is it with the language in which the phenomena are embodied: in the organic growth of a language there is a continuous differentiation, first of nouns into substantives and adjectives, then of the latter into adjectives proper and nouns abstract; synonymes again disappear, each getting its special appropriation, and superfluous words are taken up by new developments and combinations of thought. How, then, was it possible that a one-sided method, which entirely ignored the examination of nature, should do more than repeat the same things over and over again in words which, though they might be different, were yet not less indefinite? The results have answered to the absurdity of the method; for, after being in fashion for more than two thousand years, nothing has been established by it; "not only what was asserted once is asserted still, but what was a question once is a question still, and instead of being resolved by discussion is only fixed and fed." (1)

Perhaps, if men had always lived in the sunny climes of the south, where the luxuriance of nature allowed of human indolence, they might have continued vainly to speculate; but when they were brought face to face with nature in the rugged north, and were driven to force by persevering labour the means of subsistence from her sterile bosom, then there arose the necessity to observe her processes and investigate her secret ways. There was an unavoidable intending of the mind to the realities of nature; and this practice, which the exigencies of living first enforced, became in the fulness of time with those who had leisure and opportunity the disposition consciously to interrogate and interpret nature. In Roger Bacon, we see the human mind striving, as it were, unconsciously after the true method of development; while in the Chancellor Bacon, who systematized the principles and laid down the rules of the inductive philosophy, we observe it doing with design and method that which it had hitherto been blindly aiming at. But as it is with the infant, so was it with humanity; action preceded consciousness, and Bacon himself was the efflux of a spirit which prevailed and not the creator of it. By thus humbling himself to obey, man has conquered nature; and those plenteous "fruits and invented works" which Bacon confidently anticipated as "sponsors and sureties" for the truth of his method, have been reaped in the richest abundance.

It seems strange enough now to us that men should not have sooner hit upon the excellent and profitable method of induction. How came it to pass that when they surveyed organic nature, as Aristotle notably did, they failed to perceive the progress in development from the general and simple to the special and complex, which is evident throughout it? Had they but formularised this law of increasing speciality and complexity in organic adaptation to external nature, then they had scarcely failed to apply it to conscious human development; and that would have been to establish deductively the necessity of the inductive method. Unfortunately, Aristotle stood alone; and it remains his particular merit to have foreseen in some sort the value of the inductive method. Had he, also, consistently followed it in practice, which he did not, there was an impassable hindrance to its general adoption, in the moral errors engendered by the metaphysical or subjective method, of which Plato was so powerful a representative and so influential an exponent. Man, as the measure of the universe, esteemed himself far too highly to descend to be the servant and interpreter of nature; and this erroneous conceit not only affected his conception of his relation to the rest of nature, but permeated his social nature, and vitiated his whole habit of thought: the superstitious reverence of the Greek who would put to death a victorious general because he had left his dead unburied on the field of battle, must have prevented Aristotle from anatomical examination of the structure of the human body. The same errors are continually reappearing in human history: what happened in the middle ages may illustrate for us the habit of Greek thought; for at that time mistaken religious prejudice allied itself most closely with the metaphysical method which exalted man so much over the rest of nature, opposing most virulently the birth of positive science, which seemed to threaten to degrade him; and for a time it was almost doubtful which would win. Can we wonder, then, that the erroneous method was triumphant in Greece in the fourth century before Christ, when it is only recently in England, in the nineteenth century after Christ, that the barbarian's reverence for a dead body has permitted anatomical dissection, and when the finger-bone of a saint, or a rag of his clothing, is still treasured up, in some parts of the world, as a most precious relic endued with miraculous virtues! The evil of the metaphysical method was not intellectual deficiency only, but a corresponding baneful moral error.

The adoption of the inductive method, which makes man the servant and interpreter of nature, is in reality the systematic pursuance of the law of progress in organic development; it is the conscious intending of the mind to external realities, the submitting of the understanding to things, in other words, the increasing speciality of internal adjustment to external impressions; and the result is a victory by obedience, an individual increase through adaptation to outward relations, in accordance with the so-called principle of natural selection. The mental capacity of one who is deprived of any one of his senses, which are the inlets to impressions from without, or the gateways of knowledge, is less than that of one who is in the full possession of all his senses; and the great advances in science have uniformly corresponded with the invention of some instrument by which the power of the senses has been increased, or their range of action extended. Astronomy is that which the eye has been enabled to see by the telescope; the revelations of the inmost processes of nature have been due to the increased power of vision which the microscope has conferred; the extremely delicate balance has supplied to science a numerical exactness; the spectrum has furnished a means of analysing the constitution of the heavenly bodies; and the galvanometer already gives the most hopeful presage of important discoveries in nervous function. Through the senses has knowledge entered; and the intellect has in turn devised means for extending the action and increasing the discriminating exactness of the senses: there have been action and reaction and progressive specialization and complication thereof. The two aspects of this relation we designate, in their highest manifestations, as cognition and action, or science and art.

Thus much concerning the historical evolution of the inductive method. But now comes the most important question, whether it is available for the study of the whole of nature. Can we apply the true inductive and objective method to the investigation of psychical as well as of physical nature? In the latter case, it has long received universal sanction; but in the study of a man's mind it is still a question what method should rightly be employed. Plainly, it is not possible by simple observation of others to form true inductions as to their mental phenomena; the defect of an observation which reaches only to the visible results of invisible operations, exposes us without protection to the hypocrisy, conscious or unconscious, of the individual; and the positive tendency, which no one can avoid, to interpret the action of another mind according to the measure of one's own, to see not what is in the object, but what is in the subject, frequently vitiates an assumed penetration into motives. If we call to our aid the principles of the received system of psychology, matters are not mended; for its ill-defined terms and vague traditions, injuriously affecting our perceptions, and over-ruling our understanding, do not fail to confuse and falsify inferences. It must unfortunately be added that, in the present state of physiological science, it is quite impossible to ascertain, by observation and experiment, the nature of those organic processes which are the bodily conditions of mental phenomena. There would appear, then, to be no help for it but to have entire recourse to the psychological method—that method of interrogating self-consciousness which has found so much favour at all times. Before making any such admission, let this reflection be weighed: that the instinctive *nisus* of mankind commonly precedes the recognition of systematic method; that men, without knowing why, do follow a course which there exist very good reasons for. Nay more: the practical instincts of mankind often work beneficially in an actual contradiction to their professed doctrines. When in the middle ages faith was put in the philosophy of the schools, the interrogation of nature by experiment was going on in many places; and the superstitious people that believes in the direct interference of spirits or of gods, still adopts such means of self-protection as a simple experience of nature teaches. Man does not consciously determine his method and then enter upon it; he enters blindly upon it, and at a certain stage awakes to consciousness. In the onward flowing stream of nature's organic development, life first becomes self-conscious in man: in the slumbering mental development of mankind, it is the genius who at due time awakens to active consciousness the sleeping century. It would indeed go hard with mankind if they must act wittingly before they acted at all.

Two facts come out very distinctly from a candid observation of the state of thought at the present day. One of these is the little favour in which metaphysics is held, and the very general conviction that there is no profit in it: the consequence of which firmly fixed belief is, that it is cultivated as a science only by those whose particular business it is to do so, who are engaged not in action, wherein the true balance of life is maintained, but in dreaming in professorial chairs; or if by any others, by the ambitious youth who goes through an attack of metaphysics as a child goes through an attack of measles, getting haply an immunity from a similar affection for the rest of his life; or lastly, by the untrained and immature intellects of those metaphysical dabblers who continue youths for life. A second fact, which has scarcely yet been sufficiently weighed, is the extreme favour in which biography is held at the present time, and the large development which it is receiving.

Let us look first at the import of biography. As the business of a man in the world is action of some kind, and as his action undoubtedly results from the relations between him and his surroundings, it is plain that biography, which estimates both the individual and his circumstances, and displays their reactions, can alone give an adequate account of the man. What was the mortal's force of character, what was the force of circumstances, how he struggled with them, and how he was affected by them,—what was the life-product under the particular conditions of its evolution:—these are the questions which a good biography aspires to answer. It regards man as a concrete being, acknowledges the differences between men in characters and capabilities, recognises the helpful or baneful influence of surroundings, and patiently unfolds the texture of life as the inevitable result of the elements out of which, and the conditions under which, it has been worked. It is, in fact, the application of positive science to human life, and the necessary consequence of the progress of the inductive philosophy. No marvel, then, that biography forms so large a part of the literature of the day, and that novels, its more or less faithful mirrors, are in so great request. The instincts of mankind are here, as heretofore, in advance of systematic knowledge or method.

On the other hand, the metaphysician deals with man as an abstract or ideal being, postulates him as a certain constant quantity, and thereupon confidently enunciates empty propositions. The consequence is, that metaphysics has never made any advance, but has only appeared in new garb; nor can it in truth advance, unless some great addition is made to the inborn power of the human mind. It surely argues no little conceit in any one to believe that what Plato and Descartes have not done, he, following the same method, will do.* Plato interrogated his own mind, and set forth its answers with a clearness, subtlety, and elegance of style that is unsurpassed and unsurpassable; until then the very unlikely event of a better mind than his making its appearance, his system may well remain as the adequate representative of what the metaphysical method can accomplish. Superseded by a more fruitful method, it is practically obsolete; and its rare advocate, when such an one is found, may be said, like the Aturian parrot of which Humboldt tells, to speak in the language of an extinct tribe to a people which understand him not.†

But the method of interrogating self-consciousness may be employed, and is largely employed, without carrying it to a metaphysical extreme. Empirical psychology, founded on *direct* consciousness as distinguished from the *transcendental* consciousness on which metaphysics is based, claims to give a faithful record of our different states of mind and their mutual relations, and has been extravagantly lauded, by the Scotch school, as an inductive science. Its value as a science must plainly rest upon the sufficiency and reliability of consciousness as a witness of that which takes place in the mind. Is the foundation then sufficiently secure? It may well be doubted; and for the following reasons:

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* "It would be an unsound fancy and self-contradictory, to expect that things which have never yet been done can be done, except by means which have never yet been tried."—*Nov. Org.* Aphorism vi.

† "There still lives, and it is a singular fact, an old parrot in Maypures which cannot be understood, because, as the natives assert, it speaks the language of the Atures"—an extinct tribe of Indians, whose last refuge was the rocks of the foaming cataract of the Orinoco.—Humboldt: *Views of Nature*, I. p. 172.

(*a.*) There are but few individuals who are capable of attending to the succession of phenomena in their own minds; such introspection demanding a particular cultivation, and being practised with success by those only who have learned the terms, and been imbued with the theories, of the system of psychology supposed to be thereby established.

(*b.*) There is no agreement between those who have acquired the power of introspection: and men of apparently equal cultivation and capacity will, with the utmost sincerity and confidence, lay down directly contradictory propositions. It is not possible to convince either opponent of error, as it might be in a matter of objective science, because he appeals to a witness whose evidence can be taken by no one but himself, and whose veracity, therefore, cannot be tested.

(*c.*) To direct consciousness inwardly to the observation of a particular state of mind is to isolate that activity for the time, to cut it off from its relations, and, therefore, to render it unnatural. In order to observe its own action, it is necessary that the mind pause from activity; and yet it is the train of activity that is to be observed. As long as you cannot effect the pause necessary for self-contemplation, there can be no observation of the current of activity: if the pause is effected, then there can be nothing to observe. This cannot be accounted a vain and theoretical objection; for the results of introspection too surely confirm its validity: what was a question once is a question still, and instead of being resolved by introspective analysis is only fixed and fed. (²)

(*d.*) The madman's delusion is of itself sufficient to excite profound distrust, not only in the objective truth, but in the subjective worth, of the testimony of an individual's self-consciousness. Descartes laid it down as the fundamental proposition of philosophy that whatever the mind could clearly and distinctly conceive, was true: if there is one thing more clearly and distinctly conceived than another, it is commonly the madman's delusion. No marvel, then, that psychologists, since the time of Descartes, have held that the veracity of consciousness is to be relied upon only under certain rules, from the violation of which, Sir W. Hamilton believed, the contradictions of philosophy have arisen. On what evidence then do the rules rest? Either on the evidence of consciousness, whence it happens that each philosopher and each lunatic has his own rules, and no advance is made; or upon the observation and judgment of mankind, to confess which is very much like throwing self-consciousness overboard—not otherwise than as was advantageously done by positive science when the figures on the thermometer, and not the subjective feelings of heat or cold, were recognised to be the true test of the individual's temperature.

It is not merely a charge against self-consciousness that it is not reliable in that of which it does give information; but it is a proveable charge against it that it does not give any account of a large and important part of our mental activity: its light reaches only to states of consciousness, and not to states of mind. Its evidence then is not only untrustworthy save under conditions which it nowise helps us to fix, but it is of little value, because it has reference only to a small part of that for which its testimony is invoked. May we not then justly say that self-consciousness is utterly incompetent to supply the facts for the building up of a truly inductive psychology? Let the following reasons further warrant the assertion:

1. It is the fundamental maxim of the inductive philosophy that observation should begin with simple instances, ascent being made from them through appropriate generalizations, and that no particulars should be neglected. How does the interrogation of self-consciousness fulfil this most just demand? It is a method which is applicable only to mind at a high degree of development, so that it perforce begins with those most complex instances which give the least certain information; while it passes completely by mind in its lower stages of development, so that it ignores those simpler instances which give the best or securest information. In this it resembles the philosopher who, while he gazed upon the stars, fell into the water; for if, as

Bacon says, "he had looked down he might have seen the stars in the water, but looking aloft he could not see the water in the stars."(³) Where has the animal any place in the accepted system of psychology? or the child the direction of whose early mental development is commonly decisive of its future destiny? To speak of induction where so many important instances are neglected, and others are selected according to caprice or the ease of convenience, is to rob the word of all definite meaning, and most mischievously to misuse it. A psychology which is truly inductive must follow the order of nature, and begin where mind begins in the animal and infant, gradually rising thence to those higher and more complex mental phenomena which the introspective philosopher discerns or thinks he discerns. Certainly it may be said, and it has been said, that inferences as to the mental phenomena of the child can be correctly formed from the phenomena of the adult mind. But it is exactly because such erroneous inferences have been made, that the mental phenomena of the child have been misunderstood and misinterpreted, and that psychology has not received the benefit of the correction which a faithful observation of them would have furnished. It was the physiologist who by a careful observation of the lower animals, "having entered firmly on the true road, and submitting his understanding to things," arrived at generalizations which were found to explain many of the mental phenomena of the child, and which have furthermore thrown so much light upon the mental life of the adult. The careful study of the genesis of mind is as necessary to a true knowledge of mental phenomena as the study of its plan of development confessedly is to an adequate conception of the bodily life.

Again, it might be thought a monstrous mistake of nature to have produced so many idiots and lunatics, seeing that the inductive psychologists take no notice whatever of the large collection of instances afforded by these unwelcome anomalies. Certainly it may be said, and no doubt it has been said, that the mental phenomena of the idiot or lunatic are morbid, and do not, therefore, concern psychology. It is true that they do not concern a psychology which violently separates itself from nature. But it is exactly because psychology has thus unwarrantably severed itself from nature—of which the so-called morbid phenomena are no less natural a part than are the phenomena of health—that it has not sure foundations; that it is not inductive; that it has not received the benefit of the correction which a faithful observation of the unsound mind would have afforded. In reality insanity furnishes what in such matter ought to have been seized with the utmost eagerness—for they cannot be made—namely, actual experiments well suited to the establishment of the principles of a truly inductive science. The laws of mental action are not miraculously changed nor reversed in madness, though the conditions of their operation are different; and nature does not recognise the artificial and ill-starred divisions which men, for the sake of convenience, and not unfrequently in the interests of ignorance, make.

2. Consciousness gives no account of the essential material conditions which underlie every mental manifestation, and determine the character of it: let the function of an individual's optic ganglia be abolished by disease or otherwise, and he would not be conscious that he was blind until experience had convinced him of it. On grounds which will not easily be shaken it is now indeed admitted, that with every display of mental activity there is a correlative change or waste of nervous element; and on the condition of the material substratum must depend the degree and character of the manifested energy or the mental phenomenon. Now the received system of psychology gives no attention to these manifold variations of feeling in the same individual, which are due to temporary modifications of the bodily state, and by which the ideas of the relations of objects to self and to one another are so greatly influenced. The quality of the ideas which arise in the mind under certain circumstances, the whole character, indeed, of our insight at the time, is notably determined in great part by the feeling which may then have sway; and that feeling is not always objectively caused, but may be entirely due to a particular bodily condition, as the daily experience of every one may convince him, and as the earlier phenomena of insanity so strikingly illustrate.

Again, Bacon long ago set down *individual psychology* as wanting; and insisted on a scientific and accurate dissection of minds and characters, and the secret dispositions of *particular* men, so "that from the knowledge thereof better rules may be framed for the treatment of mind."(⁴) As far as the present psychology is concerned, the individual might have no existence in nature; he is an inconvenience to a system which, in neglecting the individual constitution or temperament, ignores another large collection of valuable instances. As far as truth is concerned, however, the individual is of some moment, seeing that he often positively contradicts the principles arbitrarily laid down by a theoretical system.

When the theologist, who occupies himself with the supersensuous, has said all that he has to say from his point of view; when the jurist, who represents those principles which the wisdom of society has established, has in turn exhaustively argued from his point of view; then the ultimate appeal in a concrete case must be to the physician, who deals with the bodily life; through his ground only can the theologist and jurist pass to their departments; and they must accept their knowledge of it from him: on the foundation of facts which the faithful investigation of the bodily nature lays, must rest, if they are to rest safely, their systems. Certainly it is not probable that this most desirable and inevitable result will come to pass in this day or generation; for it is not unknown how slowly the light of knowledge penetrates the thick fogs of ignorance, nor how furiously irritated prejudice opposes the gentle advent of new truth. Happily, it is certain that in the mortality of man lies the salvation of truth.

3. There is an appropriation of external impressions by the mind or brain, which regularly takes place without any, or only with a very obscure, affection of consciousness. As the various organs of the body select from the blood the material suitable to their nourishment, and assimilate it, so the organ of the mind unconsciously appropriates, through the inlets of the senses, the influences of its surroundings. The impressions which it thus receives and retains do not produce definite ideas and feelings, but they nevertheless permanently affect the mind's nature; so that as an individual consciously provides his food, and then leaves the due assimilation of it to the unconscious action of the organism, in like manner may he consciously arrange the circumstances in which he will live, but cannot then prevent the unconscious assimilation of their influence, and the correspond-

ing modification of his character. Not only slight habits of movement are thus acquired, but habits of thought and feeling are imperceptibly organized; so that an acquired nature may ultimately govern one who is not at all conscious that he has changed. Let any one take careful note of his dreams, and he will find that many of the seemingly unfamiliar things with which his mind is then occupied, and which appear to be new and strange productions, are traceable to the unconscious appropriations of the day. There are other stories on record, like that of the servant-girl which Coleridge quotes, who, in the ravings of fever, repeated long passages in the Hebrew language, which she did not understand, and could not repeat when well, but which, when living with a clergyman, she had heard him read aloud. The remarkable memories of certain idiots, who, utterly destitute of intelligence, will repeat the longest stories with the greatest accuracy, testify also to this unconscious cerebral action; and the way in which the excitement of a great sorrow, or some other cause, as the last flicker of departing life, will sometimes call forth in idiots manifestations of mind of which they always seemed incapable, renders it certain that much is unconsciously taken up by them which cannot be uttered, but which leaves its relics in the mind.

It is a truth which cannot be too distinctly borne in mind, that consciousness is not co-extensive with mind. From the first moment of its independent existence the brain begins to assimilate impressions from without, and to re-act thereto in corresponding organic adaptations; this it does at first without consciousness, and this it continues to do unconsciously more or less throughout life. Thus it is that mental power is being organized before the supervention of consciousness, and that the mind is subsequently regularly modified as a natural process without the intervention of consciousness. The preconscious action of the mind, as certain metaphysical psychologists in Germany have called it, and the unconscious action of the mind, which is now established beyond all rational doubt, are assuredly facts of which the most ardent psychologist must admit that self-consciousness can give us no account.

4. Everything which has existed with any completeness in consciousness is preserved, after its disappearance therefrom, in the

mind or brain, and may reappear in consciousness at some future time. That which persists or is retained has been differently described as a residuum, or relic, or trace, or vestige, or again as potential, or latent, or dormant idea; and it is on the existence of such residua that memory depends. Not only definite ideas, however, but all affections of the nervous system, feelings of pleasure and pain, desires, and even its outward reactions, thus leave behind them their residua, and lay the foundations of modes of thought, feeling, and action. Particular talents are sometimes formed quite, or almost quite, involuntarily; and complex actions, which were first consciously performed by dint of great application, become by repetition automatic; ideas, which were at first consciously associated, ultimately call one another up without any consciousness, as we see in the quick perception or intuition of the man of large worldly experience; and feelings, once active, leave behind them their unconscious residua, thus affecting the general tone of the character, so that, apart from the original or inborn nature of the individual, contentment, melancholy, cowardice, bravery, and even moral feeling, are generated as the results of particular life experiences. Consciousness is not able to give any account of the manner in which these various residua are perpetuated, and how they exist latent in the mind; but a fever, a poison in the blood, or a dream, may at any moment recall ideas, feelings, and activities which seemed for ever vanished The lunatic sometimes reverts, in his ravings, to scenes and events of which, when in his sound senses, he has no memory; the fever-stricken patient may pour out passages in a language which he understands not, but which he has accidentally heard; a dream of being at school again brings back with painful vividness the school feelings; and before him who is drowning every event of his life seems to flash in one moment of strange and vivid consciousness.

It has been before said that mind and consciousness are not synonymous; it may now be added, that the existence of mind does not necessarily involve the activity of mind. Descartes certainly maintained that the mind always thinks; and others, resting on that assumption, have held that we must always dream in sleep, because the mind, being spiritual, cannot cease to act; for non-activity would be non-existence. Such opinions only illustrate how completely metaphysical conceptions may overrule the best understanding; so far from the mind being always active, it is the fact that at each moment the greater part of the mind is not only unconscious but inactive. Mental power exists in statical equilibrium as well as in manifested energy; and the utmost tension of a particular mental activity may not avail to call forth from their secret repository the dormant energies of latent residua, even when most urgently needed: no man can call to mind at any moment the thousandth part of his knowledge. How utterly helpless is consciousness to give any account of the statical condition of mind! But as statical mind is in reality the statical condition of the organic element which ministers to its manifestations, it is plain that if we ever are to know anything of inactive mind it is to the progress of physiology that we must look for information.

5. Consciousness reveals nothing of the process by which one idea calls another into activity, and has no control whatever over the manner of the reproduction; it is only when the idea is made active by virtue of some association, when the *effect* solicits or extorts attention, that we are conscious of it; and there is no power in the mind to call up ideas indifferently. If we would recollect something which at the moment escapes us, the best way of succeeding confessedly is to permit the mind to work unconsciously; and while the consciousness is otherwise occupied, the forgotten name or circumstance will oftentimes flash into the memory. In composition the writer's consciousness is engaged chiefly with his pen and with the sentences which he is forming, while the results of the mind's unconscious working flow, as it were, from unknown depths into consciousness, and are by its help embodied in appropriate words.

Not only is the actual process of the association of our ideas independent of consciousness, but that assimilation or blending of similar ideas, or of the like in different ideas, by which general ideas are formed, is in no way under the control or cognizance of consciousness. When the like in two perceptions is appropriated, while that in which they differ is neglected, it would seem to be by an assimilative action of the nerve-cell or cells of the brain which, particularly modified by the first impression, have an attraction or affinity for a like subsequent impression: the cell so modified and so ministering takes to itself that which is suitable and which it can assimilate, or make of the same *kind* with itself, while it rejects for appropriation by other cells that which is unlike and which will not blend. Now this organic process takes place, like the organic action of other elements of the body, quite out of the reach of consciousness; we are not aware how our general and abstract ideas are formed; the due material is consciously supplied, and there is an unconscious elaboration of the result. Mental development thus represents a sort of nutrition and organization; or, as Milton aptly says of the opinions of good men, that they are truth in the making, so we may truly say of the formation of our general and complex ideas, that it is mind in the making. When the individual brain is a well constituted one, and has been duly cultivated, the results of its latent activity, starting into consciousness suddenly, sometimes appear like intuitions; they are strange and startling, like the products of a dream ofttimes are, to the mind which has actually produced them. Hence it was no extravagant fancy in Plato that he looked upon them as *reminiscences* of a previous higher existence. Plato's mind was a mind of the highest order, and the results of its unconscious activity, as they flashed into consciousness, might well seem intuitions of a better life quite beyond the reach of present will.

But the process of unconscious mental elaboration is sufficiently illustrated in daily experience. In dreams some can compose vigorously and fluently, or speak most eloquently, who can do nothing of the sort when awake; schoolboys know how much a night's rest improves their knowledge of a lesson which they have been learning before going to bed; great writers or great artists, as is well known, have been truly astonished at their own creations, and cannot conceive how they contrived to produce them; and to the unconscious action of the mind is owing, most probably, that occasional sudden consciousness, which almost every one at some time has, of having been before in exactly the same circumstances as those which are then happening, though the thing was impossible; but the action of the mind in the assimilation of events here anticipates consciousness, which, when aroused, finds a familiarity in them. Inventions seem, even to the discoverers, to be matters of accident and good fortune; the most voracious plagiarist is commonly the most unconscious; the best thoughts of an author are always the unwilled thoughts which surprise himself; and the poet in the inspiration of creative activity is, so far as consciousness is concerned, being dictated to. If we reflect, we shall see that it must be so; the products of creative activity, in so far as they transcend the hitherto experienced, are unknown to the creator himself before they come forth, and cannot therefore be the result of a definite act of his will; for to an act of will a conception of the result is necessary. "The character," says Jean Paul, speaking of the poet's work, "must appear living before you, and you must hear it, not merely see it; it must, as takes place in dreams, dictate to you, not you to it; and so much so that in the quiet hour before you might perhaps be able to foretell the *what* but not the *how*. A poet who must reflect whether in a given case he shall make a character say yes or no—to the devil with him: he is only a stupid corpse."*

If an inherited excellence of brain has conferred upon the individual great inborn capacity, it is well; but if he has not such heritage, then no amount of conscious effort will completely make up for the defect. As in the germ of the higher animal there is the potentiality of many kinds of tissue, while in the germ of the lower animal there is only the potentiality of a few kinds of tissue; so in the good brain of a happily endowed man there is the potentiality of great assimilation and of great and varied development, while in the man of low mental endowment there is only the potentiality of a scanty assimilation and of small development. But it is ridiculous to suppose that the man of genius is ever a fountain of self-generating energy; whosoever expends much in productive activity must take much in by appropriation; whence comes what of truth there is in the observation that genius is a genius for industry. To believe that any one, how great soever his natural genius, can pour forth with spontaneous ease the results of great productive activity, without corresponding labour in appropriation, is no less absurd than it would be to believe that the acorn can grow into the mighty monarch of the forest, without air and light, and without the kindly influence of the soil.

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* Æsthetik.

It has been previously said that mental action does not necessarily imply consciousness, and again, that mental existence does not necessarily involve mental activity: it may now be affirmed that the most important part of mental action, the essential process on which thinking depends, is unconscious mental activity. We repeat, then, the question: how can self-consciousness suffice to furnish the facts of a true mental science?

6. The brain not only receives impressions unconsciously, registers impressions without the co-operation of consciousness, elaborates material unconsciously, calls latent residua again into activity without consciousness, but it responds also as an organ of organic life to the internal stimuli which it receives unconsciously from other organs of the body. As the central organ to which the various organic stimuli of a complex whole pass, and where they are duly co-ordinated, it must needs have most important and intimate sympathies with the other parts of the harmonious system; and a regular quiet activity of which we only become occasionally conscious in its abnormal results does prevail, as the consequence and expression of these organic sympathies. On the whole, this activity is even of more consequence in determining the character of our feeling, or the tone of our disposition, than that which follows impressions received from the external world; when disturbed in a painful way, it becomes the occasion of that feeling of gloom or discomfort which does not itself give rise to anything more than an indefinite anticipation of coming affliction, but which renders ideas that arise obscure, unfaithfully representative, and painful. The rapidity and success of conception, and the reaction of one conception upon another, are much affected by the state of this active but unconscious cerebral life: the poet is compelled to wait for the moment of inspiration; and the thinker, after great but fruitless pains, must often tarry until a more favourable disposition of mind. In insanity, the influence of this activity is most marked; for it then happens that the morbid state of some internal organ becomes the basis of a painful but formless feeling of profound depression, which ultimately condenses into some definite delusion. In dreams, its influence is no less manifest; for he who has gone to sleep with a disturbance of some internal organ may find the character of his dreams determined by the feeling of

the repression of self of which the organic trouble is the cause; he is thwarted, he is afflicted, he is at school again, or under sentence of death; in some way or other his personality is oppressed. Most plainly of all, however, does the influence of the sexual organs upon the mind witness to this operation; and it was no wild flight of 'that noted liar fancy' in Schlegel, but a truly grounded creation of the imagination, that he represented a pregnant woman as being visited every night by a beautiful child, which gently raised her eyelids and looked silently at her, but which disappeared for ever after delivery.* Whatever then may be thought of the theory of Bichat, who located the passions in the organs of organic life, it must be admitted that he therein evinced a just recognition of the importance of that unconscious cerebral activity which is the expression of the organic sympathies of the brain.

In dealing with unconscious mental activity, and with mind in a statical condition, it has been a necessity to speak of brain and cerebral action where I would willingly, to avoid offence that might be taken thereat, have spoken, had it been possible, of mind and mental action; but it was impossible, if one was to be truthful and intelligible, to do otherwise. When the important influence on mental life of the brain as an organ of organic life comes to be considered, there are no words available for expressing the phenomena in the language of the received psychology, which, though it admits the brain to be the organ of the mind, takes no notice whatever of it as an organ. Let us briefly add, then, what the relations of the brain as a bodily organ are.

1. The brain has, as previously set forth, a life of relation; which may be properly distinguished into—(*a*) a relation with external nature through the inlets of the senses; and (*b*) a relation with the other organs of the body, through the nervous system distributed throughout the body. These have already been sufficiently dwelt upon here; they will receive fuller attention afterwards.

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* "In Schlegel's viel zu wenig erkanntem Florentin sieht eine Schwangere immer ein schönes Wunderkind, das mit ihr nachts die Augen aufschlägt, ihr stumm entgegen läuft u. s. w. und welches unter der Entbindung auf immer verschwindet."—Jean Paul's *Æsthetik.*

2. But the brain has also a life of nutrition, or, if we might so call it, a vegetative life. In this its true organic life there is a nutritive assimilation of suitable material from the blood by the nerve-cell, and a restoration thereby of the statical equilibrium after each display of energy. The extent of the nutritive repair and the mould which it takes must plainly be determined by the extent and form of the waste which has been the condition of the display of function: the material change or waste in the nervous cell, which the activity of an idea implies, is replaced from the blood according to the mould or pattern of the particular idea; statical idea thus following through the agency of nutritive attraction upon the waste through functional repulsion of active idea. This organic process of repair is not usually attended with consciousness, and yet it may obtrude itself into consciousness: as the function of any organ, which proceeds when all is well without exciting any sensation, does, under conditions of disorder, give rise to unusual sensation or to actual pain; so the organic life of the brain, which usually passes peaceably without exciting consciousness, may under certain conditions thrust itself forward into consciousness and produce anomalous effects. When this happens, the abnormal effect is not manifest in sensation, for the hemispheres of the brain, as physiologists well know, are not sensitive in that sense; but it is displayed in the involuntary appearance of emotional ideas in consciousness, and in consequent confusion of thought; the statical idea becomes energy, not through the usual train of association, but by reason of the abnormal stimulus from the inner life. Thus it is that the presence of alcohol, or some other such foreign agent, in the blood will excite into activity ideas which lie out of the usual path of association, which the utmost tension of consciousness would fail to arouse, and which the will cannot repress nor control. Whosoever will be at the pains of attending to his own daily experience will find that ideas frequently arise into consciousness without any apparent relation to those previously active, without, in fact, any possibility of explaining, *quoad* consciousness, why and whence they come (5).

To what has been before said of unconscious mental action this more may now be added—that the deep basis of all mental action lies in the organic life of the brain, the characteristic of which in health is, that it proceeds without consciousness. He whose brain makes him conscious that he has a brain is not well, but ill; and thought that is conscious of itself is not natural and healthy thought. How little competent, then, is consciousness to supply the facts of an inductive science of mind! Pneumatology was at one time subdivided into theology, demonology, and psychology; all three resting on the evidence of the inner witness. Demonology has taken its place in the history of human error and superstition; theology is confessedly now best supported by those who ascend from nature's law up to nature's God; and psychology, generally forsaken, stays its fall by appropriating the discoveries of physiology, preserving only in its nomenclature the shadow of its ancient authority and state. On what foundation can a science of mind surely rest save on the faithful observation of all available instances, whether psychical or physiological?

Such are the charges against self-consciousness whereon is founded the conclusion as to its incompetency: they show that he who thinks to illuminate the whole range of mental action by the light of his own consciousness is not unlike one who should go about to illuminate the universe with a rushlight. A reflection on the true nature of consciousness will surely tend to confirm that opinion. Whoever faithfully and firmly endeavours to obtain a definite idea of what is meant by consciousness, will find it nowise so easy a matter as the frequent and ready use of the word might imply. Metaphysicians, faithful to the vagueness of their ideas, and definite only in individual assumption, are by no means agreed in the meaning which they attach to it; and it sometimes happens that the same metaphysician uses the word in two or three different senses in different parts of his book: it is at one time synonymous with mind, at another time with knowledge, and at another time it is used to express a condition of mental activity. That there should be such little certainty about that upon which their philosophy fundamentally rests must be allowed to be a misfortune to the metaphysicians.

What consciousness is will appear better if its relations be closely examined without prejudice. It will then appear that it is not separable from knowledge; that it exists only as a part of the concrete mental act; that it has no more power of withdrawing from the particular phenomenon and of taking full and fair observation of it, than a boy has of jumping over his own shadow. Consciousness is not a faculty or substance, but a quality or attribute of the concrete mental act; and it may exist in different degrees of intensity or it may be absent altogether. In so far as there is consciousness, there is certainly mental activity; but it is not true that in so far as there is mental activity there is consciousness; it is only with a certain intensity of representation or conception that consciousness appears. What else, then, is the so-called interrogation of consciousness but a self-revelation of the particular mental act, whose character it must needs share? Consciousness can never be a valid and unprejudiced witness; for although it testifies to the existence of a particular subjective modification, yet when that modification has anything of a morbid character, consciousness is affected by the taint and is morbid also. Accordingly, the lunatic appeals to the evidence of his own consciousness for the truth of his hallucination or delusion, and insists that he has as sure evidence of its reality as he has of the argument of any one who may try to convince him of his error; and he is right: to one who has vertigo the world turns round. A man may easily be conscious of freewill when, isolating the particular mental act, he cuts himself off from the consideration of the causes which have preceded it, and on which it depends. "There is no force," says Leibnitz, "in the reason alleged by Descartes to prove the independence of our free actions by a pretended lively internal sentiment. It is as if the needle should take pleasure in turning to the north; for it would suppose that it turned independently of any other cause, not perceiving the insensible motions of the magnetic matter."* Is it not supremely ridiculous that while we cannot trust consciousness in so simple a matter as whether we are hot or cold, we should be content to rely entirely on its evidence in the complex phenomena of our highest mental activity? The truth is, that what has very often happened before has happened here: the quality or attribute has been abstracted from the concrete, and the abstraction then converted into an entity; the attribute, consciousness, has miraculously got rid of its substance, and with a wonderful assurance assumed the office of passing judgment upon its nature. Descartes was in this case the clever architect; and his success has fully justified his art: while the metaphysical stage of human development lasts, his work will doubtless endure.

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* Essais de Théodicée, Pt. I.

That the subjective method, the method of interrogating self-consciousness, is not adequate to the construction of a true mental science, has now seemingly been sufficiently established. This is not to say that it is worthless; for when not strained beyond its capabilities, its results may, in the hands of competent men, be very useful. D'Alembert compares Locke to Newton, and makes it a special praise to him that he was content to descend within, and that, after having contemplated himself for a long while, he presented in his 'Essay' the mirror in which he had seen himself; "in a word, he reduced psychology to that which it should be, the experimental physics of the mind." But it was not because of this method, but in spite of it, that Locke was greatly successful; it was because he possessed a powerful and well-balanced mind, the direct utterances of which he sincerely expressed, that the results which he obtained, in whatever nomenclature they may be clothed, are and ever will be valuable; they are the self-revelations of an excellently constituted and well-trained mind. The insufficiency of the method used is proved by the fact that others adopting it, but wanting his sound sense, directly contradicted him at the time, and do so still. Furthermore, Locke did not confine himself to the interrogation of his own consciousness; for he introduced the practice—for which Cousin was so angry with him—of referring to savages and children. And we may take leave to suggest that the most valuable part of Locke's psychology, that which has been a lasting addition to knowledge, really was the result of the employment of the inductive or rather objective method.* Nay more: if any one will be at the pains to examine into the history of the development of psychology up to its present stage, he may be surprised to find how much the important acquisitions of new truth and the corrections of old errors have been due, not to the interrogation of self-consciousness, but to external observation, though it was not recognised as a systematic method. The past history of psychology—its instinctive progress, so to speak—no less than the consideration of its present state, proves the necessity of admitting the objective method.

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* Psychology cannot, in fact, be truly inductive unless it is studied objectively.

That which a just reflection incontestably teaches, the present state of physiology practically illustrates. Though very imperfect as a science, physiology is still sufficiently advanced to prove that no psychology can endure except it be based upon its investigations. Let it not, moreover, be forgotten, as it is so apt to be, that the divisions in our knowledge are artificial; that they should be accepted, and used rather, as Bacon says, "for lines to mark or distinguish, than sections to divide and separate; in order that solution of continuity in sciences may always be avoided."* Not the smallest atom that floats in the sunbeam, nor the minutest molecule that vibrates within the microcosm of an organic cell, but is bound as a part of the mysterious whole in an inextricable harmony with the laws by which planets move in their appointed orbits, or with the laws which govern the marvellous creations of godlike genius. Above all things it is now necessary that the absolute and unholy barrier set up between psychical and physical nature be broken down, and that a just conception of mind be formed, founded on a faithful recognition of all those phenomena of nature which lead by imperceptible gradations up to this its highest evolution. Happily the beneficial change is being gradually effected, and ignorant prejudice or offended self-love in vain opposes a progress in knowledge which reflects the course of progress in nature: the stars in their courses fight for such truth, and its angry adversary might as well hope to blow out with his pernicious breath the all-inspiring light of the sun as to extinguish its ever waxing splendour.

No one pretends that physiology can for many years to come furnish the complete data of a positive mental science: all that it can at present do is to overthrow the data of a false psychology. It is easy, no doubt, for any one to point to the completeness of our ignorance, and to maintain that physiology never will securely fix the foundations of a mental science, just as it was easy to say, before the invention of the telescope, that the ways of the planets could never be traced and calculated. The confident dogmatist in this matter might well learn caution from the following example of the rash error of a greater man than himself:—"It is the absurdity of these opinions," said Bacon, "that has driven men to the diurnal motion of the earth; *which, I am convinced, is most false.*"* What should fairly and honestly be weighed is, that mind is the last, the highest, the consummate evolution of nature's development, and that, therefore, it must be the last, the most complex, and most difficult object of human study. There are really no grounds for expecting a positive science of mind at present; for to its establishment the completion of the other sciences is necessary; and, as is well known, it is only lately that the metaphysical spirit has been got rid of in astronomy, physics, and chemistry, and that these sciences, after more than two thousand years of idle and shifting fancies, have attained to certain principles. Still more recently has physiology emerged from the fog, and that for obvious reasons: in the first place it is absolutely dependent upon the physical and chemical sciences, and must, therefore, wait for the progress of them; and in the second place, its close relations to psychology have tended to keep it the victim of the metaphysical spirit. That, therefore, which should be in this matter is that which is; and instead of being a cause of despair, is a ground of hope.

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* De Augmentis Scientiarum, B. iv.

But let it not be forgotten that the physiological method is only one (I.) division of the objective method; there are other divisions not less valuable:—

II. The study of the *plan of development* of mind, as exhibited in the animal, the barbarian, and the infant, furnishes results of the greatest value, and is as essential to a true mental science as the study of its development confessedly is to a full knowledge of the bodily organism. By that means we get at the deep and true relations of phenomena, and are enabled to correct the erroneous inferences of a superficial observation; by examination of the barbarian, for example, we eliminate the hypocrisy which is the result of the social condition, and which is apt to mislead us in the civilized individual.

III. The study of the *degeneration* of mind, as exhibited in the different forms of idiocy and insanity, is indispensable as it is invaluable. So we avail ourselves of the experiments provided by nature, and bring our generalizations to a most searching test. Hitherto the phenomena of insanity have been most grievously misinterpreted by the vulgar, because interpreted by the false conclusions of a subjective psychology. Had not the revelations of consciousness in dreams and in delirium been completely ignored by the professed inductive psychologists, truer generalizations must perforce ere this have been formed, and fewer irresponsible lunatics would have been executed as responsible criminals. Why those who put so much faith in the subjective method do reject such a large and important collection of instances as dreams and madmen furnish, they have never thought proper to explain.

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* De Augmentis Scientiarum, B. iii.

IV. The study of the progress or regress of the human mind, as exhibited in *history*, most difficult as the task is, cannot be neglected by one who wishes to be thoroughly equipped for the arduous work of constructing a positive mental science. The unhappy tendencies which lead to individual error and degeneration are those which on a national scale conduct peoples to destruction; and the *nisus* of an epoch is summed up in the biography of its great man. Freed from the many disturbing conditions which interfere so much with his observation of the individual, the philosopher may perhaps in history discover the laws of human progress in their generality and simplicity, as Newton discovered in the motions of the heavenly bodies the law which he would in vain have looked for had he watched the fall of every apple in Europe.

May we not then truly say that he only is the true psychologist who, occupied with the observation of the whole of human nature, avails himself not only of every means which science affords for the investigation of the bodily conditions which assuredly underlie every display of function, conscious or unconscious, but also of every help which is furnished by the mental manifestations of animal and of man, whether undeveloped, degenerate, or cultivated? Here, as everywhere else in nature, the student must deliberately apply himself to a close communion with the external, must intend his mind to the realities which surround him, and thus by patient internal adjustment to outward relations gradually evolve into conscious development those inner truths which are the unavoidable expressions of the harmony between himself and nature. Of old it was the fashion to try to explain nature from a very incomplete knowledge of man; but it is the certain tendency of advancing science to explain man on the basis of a perfecting knowledge of nature.

Having fairly admitted a method, it behoves us to take heed that we are not too exclusive in its application. To this there is a strong inclination: even in the investigation of physical nature men now frequently write of induction as Bacon himself never wrote of it. It might seem from the usual fashion of speech that the function of the mind was merely that of a polished and passive mirror, in which natural phenomena should be allowed simply to reflect themselves; whereas every state of consciousness is a developmental result of the relation between mind and the impression, of the subject and object. What Bacon strove so earnestly to abolish was that method of systematically looking into the mind and, by torture of self-consciousness, drawing thence empty ideas, as the spider forms a web out of its own substance, that ill-starred divorce between mind and nature which had been cultivated by the Schoolmen as a method. What he wished, on the other hand, to establish was a happy marriage between mind and matter, between subject and object, to prevent the "mind being withdrawn from things longer than was necessary to bring into a harmonious conjunction the ideas and the impressions made upon the senses."* For, as he says, the testimony and information of the senses have reference always to man, not to the universe; and it is a great error, therefore, to assert that the sense is the measure of things. But by his method of effecting, as completely as possible, a reconciliation between the subjective and objective, he hoped to have "established for ever a true and lawful marriage between the empirical and the rational faculty, the unkind and ill-starred divorce and separation of which has thrown into confusion all the affairs of the human family." The mind that is in harmony with the laws of nature, in an intimate sympathy with the course of events, is strong with the strength of nature, and is developed by its force.

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* "Nos vero intellectum longius à rebus non abstrahimus quam ut rerum imagines et radii (ut in sensu fit) coire possint." ('Proleg. Instaurat. Magn.') This passage, as usually rendered, is not intelligible; the translation in the text, if not literally exact, evidently, as the context proves, expresses Bacon's true meaning. He had objected to all before him that some had wrongly regarded the sense as the measure of things, while others, equally wrongly, "after having only a little while turned their eyes upon things, and instances, and experience, then straightway, as if invention were nothing more than a certain process of excogitation, have fallen, as it were, to invoke their own spirits to utter oracles to them. But we," he goes on, "modestly and perseveringly keeping ourselves conversant among things, never withdraw our understanding," &c. Mr. Spedding, in his admirable edition of Bacon's works, translates the passage thus:—"I, on the contrary, withdraw my intellect from them no further than may suffice to let the images and rays of natural objects meet in a point, as they do in the sense of vision." According to this interpretation,—if there really is any meaning in it—the images and rays of objects express the same thing. Mr. Wood's translation, in Mr. Montagu's edition, is:—"We abstract our understanding no further from them than is necessary to prevent the confusion of the images of things with their radiation, a confusion similar to that we experience by our senses." This is worse still; *ut possint coire* means, certainly, that they may come together, not that they may not mingle or may be prevented from mingling. After all, the 95th aphorism furnishes the clearest and surest commentary on the passage—"Those

A contemplation of the earliest stages of human development, as exhibited by the savages, certainly constrains the admission that the conscious or designed co-operation of the mind in the adaptation of man to external nature was not great. The fact is, however, in exact conformity with what has already been asserted with regard to the nature and domain of consciousness; assuredly it is not consciousness, the natural result of a due development, which gives the impulse to development; *this* coming from a source that is past finding out—from the primeval central Power which hurled the planets on their courses, and holds the lasting orbs of heaven in their just poise and movement. In virtue of the fundamental impulse of its being

who have treated the sciences were either empirics or rationalists. The empirics, like ants, only lay up stores and use them; the rationalists, like spiders, spin webs out of themselves; but the bee takes a middle course, gathering her matter from the flowers of the field and garden, and digesting and preparing it by her native powers. In like manner, that is the true office and work of philosophy which, not trusting too much to the faculties of the mind, does not lay up the matter, afforded by natural history and mechanical experience, entire or unfashioned in the memory, but treasures it after being first elaborated and digested in the understanding. And, therefore, we have a good ground of hope, from the close and strict union of the experimental and rational faculty, which have not hitherto been united." In the very place where the obscure passage occurs, he says, after speaking of the inauspicious divorce usually made between mind and nature—"The explanation of which things, and of the true relation between the nature of things and the nature of the mind, is as the strewing and decoration of the bridal chamber of the Mind and Universe, the Divine Goodness assisting; out of which marriage let us hope (and this be the prayer of the bridal song) there may spring helps to man, and a line and race of inventions that may in some degree subdue and overcome the necessities and miseries of humanity."

mankind struggles, at first blindly, towards a knowledge of and adaptation to external nature, until that which has been insensibly acquired through generations becomes an inborn addition to the power of the mind, and that which was unconsciously done becomes conscious method.

It were well, then, that this idea took deep and firm root in our thoughts: that the development of mind, both in the individual and through generations, is a gradual process of organization—a process in which nature is undergoing her latest and most consummate development. In reality we do not fail virtually to recognise this in the case of language, whose organic growth, as we scientifically trace it, is the result of the unseen organization of thought that lies beneath, and alone gives it meaning. His own consciousness, faithfully interpreted, might suffice to reveal to each one the gradual maturing, or becoming, through which a process of thought continually goes in his mind. So has it been with mankind: at first there was an instinctive or pure organic development, the human race struggling on, as the child does, without being conscious of its *ego;* then, as it got to a certain stage of development, it becomes, as the youth does, exceedingly self-conscious, and an extravagant and unhealthy metaphysical subjectivity was the expression of an undue self-feeling; and finally, as the happily developing individual passes from an undue subjectivity to a calm objective method of viewing things, so Bacon may be said to mark the epoch of a corresponding happy change in the development of mankind. Let us entirely get rid, however, of the notion that the objective study of nature means merely the sensory perception of it; we see, not with the eye, but through it; and to any one who is above the level of the animal the sun is not a bright disc of fire about the size of a cheese, but an immense orb moving through space with its attendant planetary system at the rate of some 400,000 miles a day.* Now, such is the wondrous harmony, connexion, and continuity pervading that mysterious whole which we call nature, that it is impossible to get a just and clear idea of one pure circle of her works without that idea becoming most useful in flashing a light into obscure and unknown regions, and in thus aiding the conscious establishment of a further harmony of adaptation between man and nature.* The brilliant insight or intuition of the man of genius, who so often anticipates the slow result of systematic investigation, witnesses with singular force to that truth. Far wiser than many of his commentators have been, Bacon accordingly failed not clearly to appreciate the exceeding value of idea in the interpretation of nature.

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* "We are deluded and led by the fallacies of the senses, for instance, to believe that it is the eye that sees, and the ear that hears; although the eye and the ear are only the organs or instruments through which the soul perceives the modes of the ultimate world."—Swedenborg, *Animal Kingdom*, ii. 336.

But if the due co-operation of the mind is necessary, if the harmony of subjective and objective was Bacon's real method, in the prosecution of physical science, how much more useful must the just union of the empirical and rational faculty be in the study of mental science ; the task then being to apply the ideas of the mind to the interpretation of the mind's processes of activity. It must assuredly be allowed that the light of one's own train of thought is often most serviceable in interpreting the mind of another ; so much so, indeed, that one may know what is passing therein with not less certainty, sometimes even with greater certainty, than when it is actually uttered. In order to be successful in this sort of intuition, however, not only good natural insight, but a large experience of life and men, is most necessary, else the most grievous mistakes may be made ; here, as elsewhere, power is acquired by intending the mind to external realities, by submitting the understanding to things. Plainly, too, this objective application of our ideas is a very different matter from the deliberate direction of consciousness to its own states, that introspective analysis of the processes of thought whereby, as before said, the natural train of ideas being interrupted and the tension of a particular activity maintained, an artificial state of mind is produced, and a tortured self-consciousness, like an individual put to the torture, makes confessions that are utterly unreliable. The genuine utterances of his inner life, or the sincere and direct revelations of the man of great natural ability and good training, are the highest truths —what Plato has written is of eternal interest ; but the contradictory anatomical revelations of internal analysis by the professed psychologists are the vainest word jugglings with which a tenacious perseverance has vexed a long-suffering world. They should justly be opposed, as by Bacon; or shunned, as by Shakespeare; or abhorred, as by Goethe:—"Ich habe nie an Denken gedacht." As in the child there is no consciousness of the *ego*, so in the highest development of humanity, as represented by these our greatest, there seems to have been reached a similar unconsciousness of the *ego;* and the individual, in intimate and congenial sympathy with nature, carries forward its organic evolution with a childlike unconsciousness and a childlike success.

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* Denn wo Natur im reinen Kreise waltet ergreifen alle Welten sich.—Goethe, *Faust.*

Before concluding this chapter it may be well distinctly to affirm a truth which is an unwelcome one, because it flatters not the self-love of mankind; and it is this, that there is all the difference in the world between the gifted man of genius, who can often anticipate the slow results of systematic investigation, and who strikes out new paths, and the common herd of mortals, who must plod on with patient humility in the old tracks, "with manifold motions making little speed:" it is the difference between the butterfly which flies and feeds on honey and the caterpillar which crawls and gorges on leaves. Men, ever eager to "pare the mountain to the plain," will not willingly confess this; nevertheless it is most true. Rules and systems are necessary for the ordinarily endowed mortals, whose business it is to gather together and arrange the materials; the genius, who is the architect, has, like nature, an unconscious system of his own. It is the fate of its nature, and no demerit, that the caterpillar must crawl: it is the fate of its nature, and no merit, that the butterfly must fly. The question, so much disputed, of the relative extent of applicability of the so-called inductive and deductive methods, often resolves itself into a question as to what manner of man it is who is to use them—whether one who has senses only, who has eyes and sees not, or one who has senses and a soul; whether one who can only collect so-called facts of observation, or one who can bind together the thousand scattered facts by the organizing idea, and thus guarantee them to be facts. What an offence to the chartered imbecility of industrious mediocrity that Plato, Shakespeare, Goethe, Humboldt, Bacon too, and, in truth, every man who had anything of inspiration in him, were not mere sense-machines for registering observations, but rather instruments on which the melody of nature, like sphere music, was made for the benefit and delectation of such as have ears to hear! That some so virulently declaim against theory is as though the eunuch should declaim against lechery: it is the chastity of impotence.

So rarely, however, does nature produce one of these men gifted with that high and subtle quality called genius—being scarce, indeed, equal to the production of one in a century—and so self-sufficing are they when they do appear, that we, gratefully accepting them as visits of angels, or much as Plato accepted his super-celestial ideas, need not vainly concern ourselves about their manner of working. It is not by such anxious troubling that one will come; it is not by introspective prying into and torture of its own self-consciousness that mankind evolves the genius; the mature result of its unconscious development flows at due time into consciousness with a grateful surprise, and from time to time the slumbering centuries are thus awakened. It is by the patient and diligent work at systematic adaptation to the external by the rank and file of mankind; it is by the conscientious labour of each one, after the inductive method, in that little sphere of nature, whether psychical or physical, which in the necessary division of labour has fallen to his lot—that a condition of evolution is reached at which the genius starts forth. Tiresome, then, as the minute man of observation may sometimes seem as he exults over his scattered facts as if they were final, and magnifies his molecules into mountains as if they were eternal, it is well that he should thus enthusiastically esteem his work; and no one but will give a patient attention as he reflects how indispensable the humblest unit is in the social organism, and how excellent a spur vanity is to industry. Not unamusing, though somewhat saddening, is it, however, to witness the painful surprise of the man of observation, his jealous indignation and clamorous outcry, when the result at which he and his fellow-labourers have been so patiently, though blindly, working—when the genius-product of the century which he has helped to create, starts into life—when the metamorphosis is completed: amusing, because the patient worker is supremely astonished at a result which, though preparing, he nowise foresaw; saddening, because individually he is annihilated, and all the toil in which he spent his strength is swallowed up in the product which, gathering up the different lines of investigation and thought, and giving to them a unity of development, now by epigenesis ensues. We perceive, then, how it is that a great genius cannot come save at long intervals, as the tree cannot blossom but at its due season.

But why should any one, great or little, fret and fume because he is likely soon to be forgotten? The genius himself, as individual, is after all of but little account; it is only as the birth of the travailing centuries that he exists, only so far as he is a true birth of them and adequately representative, that he is of value: the more individual he is the more transitory will be his fame. When he is immortal he has become a mere name marking an epoch, and no longer an individual. Whosoever, in a foolish conceit of originality, strains after novelty and neglects the scattered and perhaps obscure labours of others who have preceded him, or who are contemporaneous with him; whosoever, over-careful of his individual fame, cannot carry forward his own evolution with a serene indifference to neglect or censure, but makes puerile demands on the approbation of the world—may rest content that he is not a complete birth of the age, but more or less an abortive monstrosity: the more extreme he is as a monstrosity the more original must he needs be.

Viewing mental development, whether in the individual or in the race, as a process of organization, as the consummate display of nature's organic evolution, and recognising, as we must do, the most favourable conditions of such evolution to be the most intimate harmony between man and nature, we may rightly conclude, as far as concerns the rule of a conscious method of inquiry, with the ancient and well-grounded maxim—"Learn to know thyself in nature, that so thou mayest know nature in thyself." (6)

NOTES.

[1] (*p.* 4).—"Insomuch that many times not only what was asserted once is asserted still, but what was a question once is a question still, and instead of being resolved by discussion, is only fixed and fed."—Bacon, *Proleg. Inst. Magn.*

[2] (*p.* 10).—The received psychology M. Comte calls an "illusory psychology, which is the last phase of theology," and says that it "pretends to accomplish the discovery of the laws of the human mind by contemplating it in itself; that is, by separating it from causes and effects."—Miss Martineau's *Translation*, p. 11. Again, he says, "In order to observe, your intellect must pause from activity; yet it is this very activity that you want to observe. If you cannot effect the pause, you cannot observe; if you do effect it, there is nothing to observe. The results of such a method are in proportion to its absurdity."—*Ibid.* p. 11.

[3] (*p.* 12).—"But the truth is, that they are not the highest instances which give the best or securest information, as is expressed, not inelegantly, in the common story of the philosopher, who, while he gazed upon the stars, fell into the water; for if he had looked down he might have seen the stars in the water, but, looking aloft, he could not see the water in the stars."—*De Augment. Scient.* B. ii.

[4] (*p.* 14).—*Individual Psychology* Bacon set down as wanting; he enforces its study, "so that we may have a scientific and accurate dissection of mind and characters, and the secret dispositions of particular men may be revealed, and that from the knowledge thereof, better rules may be framed for the treatment of the mind."—*De Augment. Scient.* B. vii.

[5] (*p.* 22).—"It is to be regretted that he (Dugald Stewart) had not studied (he even treats it as inconceivable) the Leibnitzian doctrine of what has not been well denominated *obscure perceptions or ideas*—that is, acts and affections of mind, which, manifesting their existence in their effects, are themselves out of consciousness or *apperception*. The fact of such latent modifications is now established beyond all rational doubt; and on the supposition of their reality, we are able to solve various psychological phenomena otherwise inexplicable. Among these are many of those attributed to habit."—Sir W. Hamilton, in his edition of Reid, p. 551.

"Ich sehe nicht," says Leibnitz, "dass die Cartesianer jemals beweisen haben oder beweisen können, dass jede Vorstellung von Bewusstsein begleitet ist." And again:—"Darin nämlich haben die Cartesianer sehr gefehlt, dass sie die Vorstellungen, deren man sich nicht bewusst ist, für nichts rechneten. Das war auch der Grund, warum sie glaubten, dass nur die Geiste Monaden waren, und dass es keine Seelen der Thiere oder andere Entelechien gebe."—Leibnitz als Denker. Auswahl seiner kleinern Aufsätze. G. Schelling. P. 108 and p. 115.

Fichte, in his *Bestimmung des Menschen* —"In jedem Momente ihrer

Dauer ist die Natur ein zusammenhängendes Ganze; in jedem Momente muss jeder einzelne Theil derselbe so sein wie er ist, weil alle übrigen sind wie sie sind; und du könntest kein Sandkörnchen von seiner Stelle verrücken, ohne dadurch vielleicht alle Theile des unermesslichen Ganzen hindurch etwas zu verändern. Aber jeder Moment dieser Dauer ist bestimmt durch alle abgelaufenen Momente, und wird bestimmen alle künftigen Momente, und du kannst in dem gegenwärtigen keines Sandkörne Lage anders denken als sie ist, ohne dass du genöthigt würdest die ganze Vergangenheit ins Unbestimmte hinauf, und die ganze Zukunft ins Unbestimmte herab dir anders zu denken."—*Sämmtliche Werke*, ii. 178.

It is only right to add, that the fullest exposition of unconscious mental action is to be found in Beneke's works. A summary of his views is contained in his *Lehrbuch der Psychologie als Naturwissenchaft.*

[6] (*p.* 35).—Since this chapter was written, and, indeed, separately published, Mr. J. S. Mill has made a powerful defence of the so-called Psychological Method. In his criticism of Comte in the *Westminster Review* for April 1865, and in his "Examination of Sir W. Hamilton's Philosophy," he has said all that can be said in favour of the Psychological Method, and has done what could be done to disparage the Physiological Method. This he had already done many years ago in the second volume of his "System of Logic," and he is now only consistent in returning to the charge. Nevertheless, the admirers of Mr. Mill cannot but experience regret to see him serving with so much zeal on what seems so desperately forlorn a hope. Physiology seems never to have been a favourite study with Mr. Mill, for it is hardly possible to conceive any one really acquainted with the present state of this science, disparaging it as he has done, and exalting so highly the psychological method of investigating mental phenomena. The wonder is, however, that he who has done so much to expound the system of Comte, and to strengthen and complete it, should on this question take leave of it entirely, and follow and laud a method of research which is so directly opposed to the method of positive science. However, though one may suspect Mr. Mill to be entirely mistaken in his estimate of the physiological method, one cannot fail to profit by the study of his arguments on behalf of the psychological method, and by his lucid exposition of its merits. For the reasons why he has not been convincing, and why this chapter has been left unmodified, I may refer to the arguments set forth in a review of his "Examination of Sir W. Hamilton's Philosophy" in the *Journal of Mental Science* for January 1866.

CHAPTER II.

THE MIND AND THE NERVOUS SYSTEM.

> "*That which perceives* is a part of nature as truly as the objects *of perception* which act on it, and, as a part of nature, is itself an object of investigation purely *physical*. It is known to us only in the successive changes which constitute the variety of our feelings: but the regular sequence of these changes admits of being traced, like the regularity which we are capable of discovering in the successive changes of our bodily frame. There is a *Physiology of the Mind*, then, as there is a *Physiology of the Body*—a science which examines the phenomena of our spiritual part simply as phenomena, and, from the order of their succession, or other circumstances of analogy, arranges them in classes, under certain general names; as, in the physiology of our corporeal part, we consider the phenomena of a different kind which the body exhibits, and reduce all the diversities of these under the names of a few general functions."—*Sketch of a System of Philosophy of the Human Mind*, by T. Brown, M.D.

THE crude proposition of Cabanis,* that the brain secretes thought as the liver secretes bile, has been a subject of much ridicule to those who have not received it with outcries of disapprobation and disgust. Assuredly it is not a just expression of the facts; one may rightly admit the brain to be the principal organ of the mind, without accepting the fallacious comparison of mental action with biliary secretion. Here as elsewhere, confusion is bred by the common use of the word "secretion" to express not only the functional process but the secreted product, both the insensible vital changes and the tangible results of them. It is of great importance to try to fix, with as much exactness as possible, what we mean by mind.

In the first place, mind, viewed in its scientific sense as a natural force, cannot be observed and handled and dealt with as a palpable object; like electricity, or gravity, or any other of the natural forces, it is appreciable only in the changes of matter which are the conditions of its manifestation. Few will now be found to deny that with each display of mental power there are correlative changes in the material substratum; that every phenomenon of mind is the result, as manifest energy, of some change, molecular, chemical, or vital, in the nervous elements of the brain. Chemical analysis of the so-called extractives of nerve testifies to definite change or "waste" through functional activity; for there are found, as products of a retrograde metamorphosis, lactic acid, kreatin, uric acid, probably also hypoxanthin, and, representing the fatty acids, formic and acetic acids. These products are very like those which are found in muscle after its functional activity: in the performance of an idea, as in the performance of a movement, there is a retrograde metamorphosis of organic element; the display of energy is at the cost of the highly-organized matter, which undergoes degeneration or passes from a higher to a lower grade of being; and the retrograde products are, so far as is at present known, very nearly the same. While the contents of nerves, again, are neutral during rest in the living state, they become acid after death, and after great activity during life: the same is the case also with regard to muscle. Furthermore, the products of the metamorphosis of nerve element after prolonged mental exercise are recognised in an increase of phosphates in the urine; while it is only by supposing an idea to be accompanied by a correlative change in the nerve-cells that we can explain the exhaustion following excessive mental work and the breaking down of the brain in extreme cases. These things being so, what is it which in a physiological sense we designate the mind? Not the material products of cerebral activity, but the marvellous energy which cannot be grasped and handled. Here, then, is made manifest a fallacy of the axiom propounded by Cabanis: it is plain that the tangible results of the brain's activity, the waste matters which pass into the blood for ultimate excretion from the body, might not less rightly be called the secretion of the brain, and be compared to the bile, than the intangible energy revealed in the mental phenomena.

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* "Nous concluons avec la même certitude que le cerveau digére en quelque sort les impressions; qu'il fait organiquement la sécrétion de la pensée."—*Rapport du Physique et du Moral de l'Homme*, par P. J. G. Cabanis.

Secondly, it is most needful, in order to avoid confusion, to settle what is commonly understood by mind, as vaguely used

It is really a general term acquired by observation of and abstraction from the manifold variety of mental phenomena: by such observation of the particular phenomena and appropriate abstraction from them we get, as an ultimate generalization, the general conception, or the, so to speak, *essential idea*, of mind. An illustration will help to exhibit what we mean. The steam-engine is a complicated mechanism, of the construction and mode of action of which many people know very little, but it has a very definite function of which those who know nothing of its construction can still form a sufficiently distinct conception; the co-ordinate, integral action of the steam-engine, as we conceive it, is different from the nicely-adjusted mechanism or from the action of any part of it. But the function of the engine is dependent on the mechanism and on the co-ordinate action of its parts, cannot be dissociated from these, and has no real existence apart from them, though it may exist separately as a conception in our minds. By observation of the mechanism and appropriate abstraction we get the *essential idea* of the steam-engine, a fundamental idea of it which, as our ultimate generalization, expresses its very nature as such, contains, as Coleridge would have said, "the inmost principles of its possibility as a steam-engine." So likewise with regard to the manifold mental phenomena; by observation of them and abstraction from the particular we get the general conception or the *essential idea* of mind, an idea which has no more existence out of the mind than any other abstract idea or general term. In virtue, however, of that powerful tendency in the human mind to make the reality conformable to the idea, a tendency which has been at the bottom of so much confusion in philosophy, this general conception has been converted into an objective entity, and allowed to tyrannize over the understanding. A metaphysical abstraction has been made into a spiritual entity, and a complete barrier thereby interposed in the way of positive investigation. Whatever be the real nature of the mind—and of that there is no need to speak here—it is most certainly dependent for its every manifestation on the brain and nervous system; d now that scientific research is daily disclosing more clearly relations between it and its organ, it is plainly most desirable uard against the common metaphysical conception of mind, by recognising the true subjective character of the conception and the mode of its origin and growth.

A third important consideration is, that mental power is truly an organized result, not strictly speaking built up, but matured by insensible degrees in the course of life. The brain is not, like the liver, the heart, or other internal organ, capable from the time of birth of all the functions to which it ever ministers; for while, in common with them, it has a certain organic function to which it is born equal, its high special functions in man as the organ of animal life, the supreme instrument of his relations with the rest of nature, are developed only by a long and patient education. Though the brain, then, is formed during embryonic life, its highest development only takes place after birth; and, as will hereafter appear, the same gradual progress from the general to the special which is exhibited in the development of the organ is witnessed in the development of our intelligence. How inexact and misleading, in this regard, therefore, is any comparison between it and the liver!

Nevertheless, it must be distinctly laid down, that mental action is as surely dependent on the nervous structure as the function of the liver confessedly is on the hepatic structure: that is the fundamental principle upon which the fabric of a mental science must rest. The countless thousands of nerve cells, which form so great a part of the delicate structure of the brain, are deemed to be the centres of its functional activity: we know right well from experiment, that the ganglionic nerve cells scattered through the tissues of organs, as, for example, through the walls of the intestines, or the structure of the heart, are centres of nerve force ministering to their organic action; and we may fairly infer that the ganglionic cells of the brain, which are not similarly amenable to observation and experiment, have a like function. Certainly they are not inexhaustible centres of self-generating force; they give out no more than what they have in one way or another taken in; they receive material from the blood, which they assimilate, or make of the same *kind* with themselves; a correlative metamorphosis of force necessarily accompanying this upward transformation of matter, and the nerve cell thus becoming, so long as its equilibrium is preserved, a centre of statical power of the highest vital quality. The maintenance of the equilibrium of nervous element is the condition of latent thought—it is mind statical; the manifestation of thought implies the change or destruction of nervous element. The nerve cell of the brain, it might in fact be said, represents statical thought, while thought represents dynamical nerve cell, or, more properly, the energy of nerve cell.

So far from discussing whether the mind is the function of the brain, the business of science now is the more special investigation of the conditions of activity of the ganglionic nerve cell or groups of nerve cells. If we look to those humbler animals in which nervous tissue makes its first appearance, it is plain that the simple mode of its existence in them allows of no other manner of proceeding; if we trace upwards the gradual increasing complication of the nervous system through the animal kingdom, it is evident that such manner of proceeding is the only one to furnish the materials of a comprehensive and safe induction; and if we duly weigh the results of physiological experiment and pathological research, it is no less certain that we must discard scientific investigation altogether in cerebral physiology if we reject the ganglionic nerve cell of the brain as a centre of mental force.

In the lowest forms of animal life nerve does not exist. The stimulus which the little creature receives from without would seem to produce some change in the molecular relations of its almost homogeneous substance, and these insensible movements collectively to amount to the sensible movement which it makes; the molecular process in such case being perhaps not unlike that which ensues, and issues in the coagulation of the blood, when the fibrine is brought in contact, as some think, with a foreign substance. The perception of the stimulus by the creature is the molecular change which ensues, the imperceptible motion passing, by reason of the homogeneity of its substance, with the greatest ease from element to element of the same *kind*, as it were by an infection, or as happens in the sensitive plant; and the sum of the molecular motions, as necessarily determined in direction by the form of the animal, results in the visible movement. The recent researches of Graham into the colloidal condition of matter have proved the necessity of some modifications in our usual conceptions of solid matter:

instead of the notion of impenetrable, inert matter, we must substitute the idea of matter which, in its colloidal state, is penetrable, exhibits energy, and is widely susceptible to external agents, "its existence being a continued metastasis."* This sort of energy is not a result of chemical action, for colloids are singularly inert in all ordinary chemical relations, but a result of its unknown intimate molecular constitution; and the undoubted existence of colloidal energy in inorganic substances, which are usually considered inert and called dead, may well warrant the belief of its larger and more essential operation in organic matter in the state of instability of composition in which it is when under the condition of life. Such energy would then suffice to account for the simple uniform movements of the homogeneous substance of which the lowest animal consists; and the absence of any differentiation of structure is a sufficient reason of the general uniform reaction to different impressions.

With the differentiation of tissue and increasing complexity of organization, which are met with as we ascend in the animal kingdom, the nervous tissue appears, but at first under a very simple form. Its simplest type may be represented as two fibres that are connected by a nerve-cell; the fibres are apparently simple conductors, and might be roughly compared to the conducting wires of a telegraph, while the cell, being the centre in which nerve force is generated, may be compared to the telegraphic apparatus; in it the effect which the stimulus of the afferent nerve excites, is transmitted along the efferent nerve, and therein is displayed the simplest form of that *reflex* action which plays so large a part in animal life.† Owing to the differences of *kinds* of tissue, and to the specialization of organs in the more complex animal, there cannot plainly be that intimate molecular sympathy between all parts which there is in the homogeneous substance of the simplest monad—not the easy motion, as by an infection, from particle to particle in the heterogeneous body, where the elements are of a different kind; and accordingly special provision is made for ensuring communication between different parts, and for co-ordinating the activity of different organs. This function the nervous system subserves; and we might compare it to that which the gifted generalizer fulfils in human development; he grasps the results of the various special investigations which a necessary division of labour enforces, brings them together, and elaborates a result in which the different lines of thought are co-ordinated, and a unity of action is marked out for future progress. The nervous system effects the synthesis which the specialization of organic instruments in the analysis of nature renders necessary; it is the highest expression of that principle of individuation which is the characteristic feature of life in all its forms, but most manifest in its highest. To this function it is well adapted, first, by the extent of its distribution, and, secondly, by its exceeding sensibility, whereby an impression made at one part is almost instantly felt at any distance.

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* Philosophical Transactions, 1862.

† *Fibres, simple conductors:* Philippeau and Vulpian (Comptes Rendus vi.), and Rosenthal (Centralblatt, No. 29, 1864) have succeeded in uniting the central end of the cut lingual nerve with the peripheral end of the cut hypoglossal. The half of the tongue of that side was paralysed, but stimulation of the nerve below the place of union produced the expression of pain, and movements of the animal.

With the increasing complexity of organization which marks the increasing speciality of organic adaptation to external nature, or, in other words, which marks an ascent in the scale of animal life, there is a progressive complication of the nervous system: special developments ministering to special purposes take place. The fibres appear to preserve their characters as simple conductors, while a development of special structures at their peripheral, and of special ganglionic cells at their central endings, reveals the increasing speciality and complexity of function. Upon the special structures at the peripheral ends, which are, as it were, the instruments of analysis, depends the kind of the impression made; and by the nature of the nerve-cells with which the central end of the nerve is connected, are determined the kind of impression that is perceived, and the character of the reaction thereto. Accordingly, we find that with the appearances of the organs of the special senses, as we rise in the scale of animal life, there is a corresponding increase in the ganglionic centres, which being clustered together, form the primitive rudiments of a brain, and represent, in the main, those sensory ganglia which in man lie between the decussation of the pyramids and the floors of the lateral ventricles. It is not known with certainty when the different organs of the special senses severally make their first appearance, for they are at first very rudimentary; but it is certain that special structures, adapted to the reception of particular impressions, as of light, of sound, of touch, render the higher animal capable of more numerous, special, and complex relations with external nature.[*]

Not till we arrive as high as the fishes, and not then in the singular Amphioxus, do we discover anything more in the brain than sensory ganglia connected with the origins of nerves; so far there is no trace of cerebral hemispheres, or of brain proper. It is plain then, that the cerebral hemispheres are not essential to sensation and the motor reaction to sensation; for they are altogether wanting where both these functions are displayed in a lively and vigorous way. To the simpler relation between the individual organism and external nature, which is denoted by *reflex* action, there now succeeds that more complex relation which is designated *sensory perception* and *sensorimotor reaction*: in place of reaction to a general stimulus, there are now a discrimination of impressions, and corresponding special reactions by virtue of structures specially adapted. This condition of the development of the nervous system, which is natural and permanent in so many of the lower animals, corresponds to that artificial state of things which may be produced experimentally in a higher animal by depriving it of its hemispheres. The kind of function manifest is strictly comparable to the early brief mental stage of the infant's life before the cerebral hemispheres have come into action, or to those phenomena of mental life sometimes displayed by the adult, as for example by the somnambulists, when the influence of the cerebral hemispheres is suspended.

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[*] When a special sense fails in man, the general sensibility may partially replace it. "I have known several instances," says Abercrombie, "of persons affected with that extreme degree of deafness, which occurs in the deaf and dumb, who had a peculiar susceptibility to particular kinds of sounds, depending, apparently, on an impression communicated to their organs of touch or simple sensation. They could tell, for instance, the approach of a carriage in the street without seeing it before it was taken notice of by persons who had the use of all their senses."—*On the Intellectual Powers.* Kruse, who was completely deaf, nevertheless had a bodily feeling of music; and different instruments affected him differently. Musical tones seemed to his perception to have much analogy with colours. The sound of a trumpet was yellow to him; that of a drum, red; that of the organ, green; &c.—*Early History of Mankind*, by J. B. Tylor. In his *Reminiscences of the Opera*, Mr. Lumley tells of a friend who used to compare the voices of the different celebrated singers to different colours, distinguishing them so. It is an old saying of a blind man, that he thought scarlet was like the sound of a trumpet.

Here let us make a reflection: how important it is clearly to distinguish and denote special features, which, being included under or described by a general term, are so commonly confounded. What different perceptions or reactions, for example, are confounded by the loose way of using the word sensibility! The infusorial animalcule, which has no nervous tissue, is said to be sensible of a stimulus; the higher animal, with its special senses, to be sensible of light, or of sound, as the case may be; and, if made to suffer, to be sensible of pain; while it is common enough to speak of man being sensible of pleasure, horror, or disgust, according to the nature of the active ideas. If we use the generic term sensibility to express the fundamental reaction, as we may perhaps properly do, it is highly important that we proceed further to distinguish by appropriate terms the special differences; the sensibility of pain is not the sensibility of sense, nor is the sensibility of the infusorial equivalent to either of these. So far we have taken pains to distinguish that form of sensibility and reaction proper to the lowest animals, and which might be called *irritability;* that form of reaction, or *reflex* action, which is the lowest expression of nervous function; and that form of reaction to which the sensory ganglia minister, and which is rightly called *sensorial.*

It is in fishes that the rudiments of cerebral hemispheres first appear. In them they are represented by a thin layer or projection of nervous matter in front of the corpora quadrigemina, covering the corpora striata and the optic thalami; in the Amphibia, they have already increased somewhat in size;* in Birds, the corpora quadrigemina are pushed out to some extent by their further increase; in the Mammalia, they begin to cover the corpora quadrigemina, and, as we ascend in the scale of life, gradually increase backwards until, in some of the higher monkeys, and in man, they entirely cover the cerebellum.

In this ascent through the series of vertebrate animals, it is found that the relations of the sensory ganglia remain alike throughout, the chief differences being differences in the relative size of them. Their functions as primary constituents of the brain may then fairly be counted the same in all the vertebrata, and, indeed, in all the animals in which they exist. As the hemispheres appear as secondary constituents—*secondary*, be it noted, in the order of development, but *primary* in dignity—we may rightly conclude their function to be secondary to that which the primary constituents or sensory ganglia fulfil. The impressions received by the sensory centres when they do not react directly outwards, as they may do where hemispheres exist, and as they must do where hemispheres do not exist, are in fact passed onwards in the brain to the cells which are spread over the hemispheres, and there further fashioned into what are called *ideas* or *conceptions*. Here then we come to another kind of sensibility, with its appropriate reaction, to which a special nervous centre ministers; and it is known as *perception*, or, more strictly, *ideational* perception. As the hemispheres have this function, and are not necessary to sensory perception, it is quite in accordance with what might be predicted, that, as experiments prove, they are insensible to *pain*, and do not give rise to any display of that kind of feeling when they are injured.* They have, agreeably to their special nature, a sensibility of their own to the ideas that are fashioned in them; so that these may be pleasurable or painful, or have other particular *emotional* qualities.†

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* The Perenni-branchiate reptiles retain the fish character of brain all their lives; the Batrachians have it only during their tadpole state.

Observation of the mental phenomena of those animals in which cerebral hemispheres exist, fully confirms the foregoing view of their function and import. In Fishes there is the first distinct appearance of simple ideas, and of the lowest rudiments of emotion: carp will collect to be fed at the sound of a bell, thus giving evidence of the association of two simple ideas; and a shark, suspicious of mischief, will avoid the baited hook. In Birds, conformably to the increased development of the hemispheres, the manifestations of intelligence are much greater;

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* An animal—a hen, for example—which makes violent movements while the skin is being cut and the roof of its skull removed, remains quite quiet while its hemispheres are being sliced away bit by bit.

† Emotion is strictly, perhaps, the sensibility of the supreme centres to ideas.

the tricks which some of them may be taught are truly marvellous, and those who teach them know how much different birds differ in intelligence and temper. Nor are simple emotional exhibitions wanting amongst them; very evident at times is the feeling of rivalry or jealousy in canaries, and there are undoubted instances on record in which an orphan bird has owed its life to the kindly care of birds of a different species.* In Mammalia a gradual advance in intelligence may be traced from very lowly manifestations up to those highest forms of brute wisdom which assuredly differ only in degree from the lowest forms of human intelligence.† Consider how plainly, in the dog, a conception often intervenes between the sensation and the usual respondent movement, so that the animal refrains from doing what it has a strong impulse to do; the impression has been passed on to the hemispheres, and their controlling action brought into play. It is needless to speak of the various emotions, nay, the veritable moral feeling, displayed by the dog and other domesticated animals. A single reflection will show, what anatomy might lead us to predicate, how limited is the range of animal intelligence: if the fox, cunning as it is, had but the sense to learn to climb a tree, like the cat, men would soon give up hunting it. But the fox, like so many men, cannot get out of the usual groove of thought, cannot originate anything; and, like not a few scheming plotters, it wastes a great deal of low cunning in efforts which a little larger view of things would render quite unnecessary.

As we ascend through the Mammalian series, we find that not only do the hemispheres increase in size by gradually extending backwards, but that the grey surface of them is further increased by being thrown into folds or convolutions. While the lower Mammals are entirely destitute of such convolutions, these are present, as a rule, in simple forms in the Ruminantia and Pachydermata; they are more fully developed in the Carnivora, and most fully developed in the apes and in man. It is true that we cannot at present exhibit an exact relation between the development of the convolutions and the degree of intelligence in different animals; for the brains of the ass, the sheep, and the ox are more convoluted than those of the beaver, the cat, and the dog. But the relative size of the animals must be taken into account in such comparison. The volume of a body such as the brain, which increases in size, increases in greater proportion than the superficies, and the latter again in greater proportion than the diameter. Now in each natural group or order of Mammalia, the head, but especially the capacity of the skull, has a certain relation to the body, a relation which remains pretty constant in different species; the head of the tiger or of the lion, for example, has about the same relation to the body as that of the cat's head to its body, although the sizes of the animals are so different. It follows, then, that, the volume of the brain of the tiger in relation to the size of the body being the same as in the cat, the superficies of the brain is proportionately greater in the smaller animal; and that, consequently, to obtain an equal extent of grey superficies, this must be convoluted in the larger animal, when it may remain nearly smooth in the smaller one. If in two animals of equal size, and of like form of structure, the convolutions are differently fashioned, then it may be said with certainty that one will be more intelligent than the other in proportion as its convolutions are more numerous and complicated, and the sulci deeper.

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* *Anatomie comparée du Système Nerveux*, par Leuret et Gratiolet.

† For examples of wonderful intelligence in different animals, I may refer to a paper by me on the *Genesis of Mind* in the *Journal of Mental Science*, 1862.

That proposition is true of man. The intellectual differences which exist between the Bosjesman, or the Negro, and the European are attended with differences in the extent and complication of the nervous substance of the brain. Gratiolet has carefully figured and described the brain of the Hottentot Venus, who was no idiot; and what is at once striking in the figure is the simplicity and regular arrangement of the convolutions of the frontal lobe; they present an almost perfect symmetry in the two hemispheres, "such as is never exhibited in the normal brains of the Caucasian race," and which involuntarily recalls the regularity and symmetry of the cerebral convolutions in the lower animals. The brain of this Bosjeswoman was, in truth, inferior to that of white men arrived at the normal stage of development: "it could be compared only with the brain of a white who is idiotic from arrest of cerebral development." Moreover, the differences between it and the brain of the white are unquestionably of the same kind as, though less in degree than, those which exist between the ape's brain and that of man, as Prof. Huxley has distinctly pointed out.* Mr. Marshall has recently examined a Bushwoman's brain, and has found like evidence of structural inferiority; the primary convolutions, though all present, were smaller than in the European, and much less complicated; the external connecting convolutions were still more remarkably defective; the secondary sulci and convolutions were everywhere decidedly less developed; there was a deficiency of the system of transverse commissural fibres; and in size, and in every one of the signs of comparative inferiority, "it leaned, as it were, to the higher quadrumanous forms."† The brain of the Negro is superior to that of the Bushman, but still it does not reach the level of the white man's brain; the weight of the male Negro's brain is less than that of the average European female; and the greater symmetry of its convolutions, and the narrowness of the hemispheres in front, are points in which it resembles the brain of the ourang-outang, as even Tiedemann, the Negro's advocate, has admitted.

Among Europeans it is found that, other circumstances being alike, the size of the brain bears a general relation to the mental power of the individual, although apparent exceptions to the rule sometimes occur. The average weight of the brain in the educated class is certainly greater than in the uneducated; and some carefully-compiled tables in a valuable paper by Dr. Thurnam prove that, while the *average* brain weight of ordinary Europeans is 49 oz., that of distinguished men is 54·6 oz.‡ On the other hand, the brain is commonly very small in idiots; the parts being not only smaller, but less complex, and the convolutions in particular being simpler and less developed. Mr. Marshall found the convolutions of the cerebra of the two idiots which he examined to be fewer in number than in the apes, the brains being in this respect more simple than the brain of the gibbon, and approaching that of the baboon. In fact, there are microcephalic idiots which present a complete series of stages from men to the apes. As a general proposition, it is certainly true that we find the evidence of a correspondence between the development of the cerebral hemispheres and the degree of intelligence, when we examine the different races of men, as we do when we survey the scale of animal life.

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* Man's Place in Nature.

† Philosophical Transactions, 1865.

‡ On the Weight of the Human Brain, by John Thurnam, M.D.—*Journal of Mental Science*, April 1866. Professor Wagner has carefully figured and described the brains of five very distinguished men. The extremely complex arrangement of the convolutions was most remarkable.—*The Convolutions of the Human Cerebrum*, by W. Turner, M.B. 1866.

As in the series of the manifold productions of her creative art Nature has made no violent leap, but has passed by gentle gradations from one species of animal to another, and from the highest animal to the lowest man, it is not surprising that the embryonic development of man should plainly reveal the general type. It admits of no question that man does, in the course of his development, pass through stages closely resembling those through which other vertebrate animals pass; and that these transitory conditions in him are not unlike the forms that are permanent in the lower animals. There is a very close morphological resemblance between the human ovum and the lowest animals with which we are acquainted, the microscopic Gregarinida;* in both, an outer membrane contains a soft semi-fluid substance, at one end of which is a delicate vesicle, having in it a solid particle or spot. At the earliest stages of its development, again, no human power can distinguish the human ovum from that of a quadruped; and, as it proceeds to its destined end, it passes through similar stages to those through which other vertebrate embryos pass. That which is true of the whole body is true also of the development of the brain. The brain of the human fœtus at the sixth week consists of a series of vesicles, the anterior of which, a double one, representing the cerebrum is the smallest, and the posterior, representing the cerebellum, the largest. In front of the latter is the vesicle of the corpora quadrigemina; and in front again of this, the vesicle of the third ventricle, which contains also the thalami optici, and which, as development proceeds, becomes covered, as do the corpora quadrigemina, by the backward growth of the hemispheres in front of it. At this stage the human brain resembles the fully-formed brain of the fish, more closely the brain of the fœtal fish, in the small proportion which the cerebral hemispheres bear to the other parts, in the absence of convolutions, in the deficiency of commissures, and in the general simplicity of structure. About the twelfth week of embryonic life there is a great resemblance to the brain of the bird: the cerebral hemispheres are much increased in size, and arch back towards the thalami optici and the corpora quadrigemina, though there are still no convolutions, and the commissures are very deficient. Up to this time the cerebral hemispheres represent no more than the rudiments of the anterior lobes; they do not yet completely cover the thalami optici, nor indeed pass the grade of development which is permanent in the Marsupial Mammalia. During the fourth and early part of the fifth month, the middle lobes develop backwards and cover the corpora quadrigemina; and, subsequently, the posterior lobes sprout out, so to speak, and gradually extend backwards so as to cover and overlap the cerebellum. It was upon the erroneous assumption that the posterior lobes were peculiar to man, that Professor Owen grounded his division of the *Archencephala*; but it has now been proved unquestionably that the posterior lobes exist in the apes, and that in some of them they extend as far back as they do in man. It is easy to perceive, then, that an arrest of development of the human brain may leave it very much in the condition of an animal brain; and it is found in some cases, as a matter of fact, that congenital idiots have brains very like those of the monkeys.

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* "The Gregarinida," says Huxley, "are all microscopic, and any one of them, leaving minor modifications aside, may be said to consist of a sac, comprised of a more or less structureless, not very well defined membrane, containing a soft semi-fluid substance, in the midst, or at one end, of which lies a delicate vesicle; in the centre of the latter is a more solid particle. No doubt many persons will be struck with the close resemblance of the structure of this body to that which is possessed by the ovum. You might take the more solid particle to be the representative of the germinal spot, and the vesicle to be that of the germinal vesicle; while the semi-fluid sarcodic contents might be regarded as the yelk, and the outer membrane as the vitelline membrane. I do not wish to strain the analogy too far, but it is at any rate interesting to observe the close morphological resemblance between one of the lowest of animals, and that form in which all the higher animals commence their existence."—*Lect. on Comp. Anat.*, 1864.

As man is thus a sort of compendium of animal nature, parallels nature, as Sir Thomas Browne has it, in the cosmography of himself, all the different modes of nervous action are exhibited in the workings of his organism. The so-called irritability of tissue, whereby it reacts to a stimulus without the help of nerve, may be of the same kind as that molecular energy of matter manifest in the movements of the humblest animal; whether the nerve ends outside the sarcolemma of muscle, or within it, there can be no doubt that it is not distributed to every part of the sarcous element; and, at any rate, when all nervous influence is withdrawn, an energy still exists sufficient to produce rigor mortis of the muscle.* The simplest mode of nervous action in man, comparable to that of the lowest animals that possess nerve, is exhibited by the scattered ganglionic cells which are concerned in certain organic processes: the heart's action, for example, is due to the ganglionic cells dispersed through its substance. Meissner has recently shown that nerve cells disseminated through the tissues of the intestines govern their motions; and Lister thinks it probable that cells scattered in the tissues preside over the contractions of the arteries, and even the diffusion of the pigment granules in the stellate cells of the frog's skin. The separate elements of the tissue are co-ordinated by the individual nerve cells; and these co-ordinating centres, again, are found to be under the control of the cerebro-spinal centres. In the spinal cord the ganglionic nerve cells are collected together, and so united that groups of them become independent centres of combined movements in answer to stimuli; this arrangement representing also the entire nervous system of those animals in which no organs of special sense have yet appeared. Still higher in the scale of the nervous system, the sensory ganglia, formed of multitudes of specially endowed cells, are clustered together, and form a very important part of the brain of man, while in many animals, as already seen, they constitute the whole of the brain. In the cerebral hemispheres there is a still greater specialization of structure; and, conformably to its highest degree in man, there are in him the most complex manifestations of mental function. In the human organism, then, is summed up the animal kingdom, which actually presents us with a sort of analysis of it; for in the functions of man we observe, as in a microcosm, an integration and harmonious co-ordination of different vital actions which are separately displayed by different members of the animal kingdom.

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* It has recently been maintained by Bilharz and Kühne, that the nerves pass by continuity into the muscular substance, as in the electric organs of the fishes they pass continuously into the protoplasm of the electric plates. Pflüger has found also that the nerves to the glands penetrate the walls of the cells, and end in the nuclei.—Pflüger, *Die Endigungen der Absonderungsnerven*, 1866.

In dealing with the function of the nervous system in man, it is, then, most necessary to distinguish the different nervous centres:—

1. There are the *primary* centres, or *ideational* centres, constituted by the grey matter of the convolutions of the hemispheres.

2. There are the *secondary* nervous centres, or *sensational* centres, constituted by the collections of grey matter that lie between the decussation of the pyramids and the floors of the lateral ventricles.

3. There are the *tertiary* nervous centres, or centres of *reflex* action, constituted mainly by the grey matter of the spinal cord.

4. There are *quaternary* nervous centres, or *organic* nervous centres, as we might call them, belonging to the sympathetic system.

Each distinct centre is subordinated to the centre immediately above it, but is at the same time capable of determining and maintaining certain movements of its own without the intervention of its supreme centre. The organization is such that a due independent local action is compatible with the proper control of a superior central authority. The ganglionic cell of the sympathetic co-ordinates the energy of the separate elements of the tissue in which it is placed, and thus represents the simplest form of a principle of *individuation;* through the cells of the spinal centre the functions of the different organic centres are so co-ordinated as to have their subordinate but essential place in the movements of animal life,—and herein is witnessed a further and higher individuation;* the spinal centres are similarly controlled by the sensory centres, and the sensory centres, in their turn, are subordinate to the controlling action of the cerebral hemispheres, and especially to the action of the will, which, properly fashioned, represents the highest display of the principle of *individuation*. The greater the subordination of parts in any animal, the higher and the more perfect it is.* Were it not well if man in his social life could contrive to imitate this excellent organization?

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* Coleridge, in his "Hints towards the Formation of a comprehensive Theory of Life," takes from Schelling the definition—"Life is the principle of Individuation."

Most important and varied functions having been assigned to nerve cells, it may be asked, On what evidence do the statements rest? On the evidence of anatòmical investigation, experiments upon animals, and physiological and pathological researches.

(*a*) *Anatomical Evidence.*—It is certainly not possible to trace every nerve fibre to its connexion with a cell, and till lately no such connexion had been distinctly seen; but it has now been observed in many instances, and all competent investigators believe that neither in the brain nor in the spinal cord does there exist an isolated apolar nerve cell; such, if supposed to be seen, being in reality one which has had its processes torn away, or not being a nerve cell at all, but a connective tissue corpuscle. This is an inference which has scarcely less certainty than an observed fact; it is not necessary, as Goethe has said, to travel round the world in order to feel sure that the heavens are everywhere above it.

Granting the constant connexion of the fibre with the cell, are the ganglionic cells so numerous and so arranged as to render it conceivable that they can adequately minister to the manifold, complex manifestations of our mental life?

Most certainly: Mr. Lockhart Clarke finds that most of the convolutions of the human brain consist of no less than *eight* distinct and concentric layers, formed chiefly of fine, closely-packed fibres, and of crowds of cells of very different shapes, the layers differing in the relative proportion of cells and fibres, and in the manner of their arrangement. The fibres are frequently seen to become continuous with the processes of the cells; and the general result of minute research is, that an infinite number of communications in all directions exist between an infinite multitude of cells of all varieties of shape—

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* After speaking of an organism as a collection of individual elements, Goethe goes on to say:—"Je unvolkommener das Geschöpf ist desto mehr sind diese Theile einander gleich oder ähnlich, und desto mehr gleichen sie dem Ganzen. Je volkommener des Geschöpf wird, desto unähnlicher werden die Theile einander. Je ähnlicher die Theile einander sind, desto weniger sind sie einander subordinirt. Die Subordination der Theile deutet auf ein volkommeneres Geschöpf."

pyramidal, pyriform, triangular, round, oval, or fusiform.* Bear in mind that the grey matter of the convolutions is thickly beset with these countless thousands of ganglionic cells varying in diameter from the $\frac{1}{12000}$th to $\frac{1}{300}$th of an inch.

But if the cells, so small and apparently so like, have such different functions, it is necessary to assume that there must be differences in their structure or composition. Most likely such differences there are, though we have not yet means subtle enough to detect them. Mr. Clarke has, however, found some modifications in the structure of different convolutions. Those at the end of the posterior lobe, for example, are not only marked by the greater distinctness of their laminæ, but contain a greater number of cells of a *much larger* kind than usual—peculiar pyramidal cells with quadrangular bases, which give off four or more processes, the opposite end of the cell tapering into a straight process, which runs towards the surface, giving off minute branches, and becomes lost in the surrounding network. The cells of the convolutions in man, again, certainly differ in some respects from those of the larger Mammalia, as the ox, sheep, and cat. Schroeder van der Kolk has found a different structure of the grey substance in the anterior and posterior lobes of the dog and the rabbit: in the anterior lobes of the rabbit there are bundles of fibres, with cells, mostly tripolar, between them; in the posterior lobes there is a regular series of pedunculated cells, which are placed close to one another, like organ pipes; there are also single larger cells. As the result of his investigations, continued through an industrious lifetime, he states positively that, wherever there are differences of function, there differences of structure and composition and connexion do exist; "microscopical investigation has established this in the completest manner." †

Howbeit there are observable differences in the size and configuration of the cells of the cortical layer, as of the cells of other centres, yet it is clear that we cannot at present penetrate those intimate special differences in constitution which the variety of their functions implies. These essential differences are not such, indeed, as the microscope is ever likely to reveal; for they probably depend on the intimate chemical composition, and are not likely, even if we could isolate cells as required, to be disclosed until chemistry has arrived at a microscopical application, or until some means has been discovered of penetrating the molecular constitution of nervous element. Those who may be disposed to think it impossible that such important constitutional differences should exist in so small a compass, might reflect with advantage on the various undetectable conditions which may confessedly exist in the minutest organic matter; as, for example, in the delicate microscopic spermatozoon, or in the intangible virus of a fever. Consider, again, the infinite littleness of the odorous particles that affect the smell, and, more wonderful still, the marvellous discriminating susceptibility of sense to so minute agents. Of what may happen in a world into which human senses have not yet been able to enter we are no more entitled to speak than the blind man is to talk of the appearance of objects. In such matter it would be more wise to adopt Tertullian's maxim, "Credo quia impossibile est," than that which is so much favoured by the conceit of human ignorance—that a thing is impossible because it appears to be inconceivable.

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* Proceedings of the Royal Society, vol. xii. 1863.

† Die Pathologie und Therapie der Geisteskrankheiten auf Anatomisch-Physiologischer Grundlage. Von J. L. C. Schroeder van der Kolk, 1863.

(*b*) *Experiments on Animals* have distinctly proved the differences between the functions of the ganglionic cells that constitute the principal different nervous centres; but such results will more properly find their place afterwards. Let it suffice here to say that the sight of an animal may be destroyed by injury to its corpora quadrigemina as surely as by burning out its eyes. Nothing, however, has yet been done by experiments towards distinguishing the functions of different convolutions.

(*c*) *Physiological Evidence.*—The study of the plan of development of the nervous system through the animal kingdom, with the corresponding progress in complexity of function, undoubtedly furnishes the best testimony in favour of differences in the constitution and function of the nerve cells. That evidence has already been sufficiently set forth.

The hopeless vanity of all discussions concerning infinite or absolute truth might well have been made manifest by this physiological reflection: that our perception of external nature is the *effect* which the object produces, through an adapted medium, in certain of our central nervous cells, an effect on which we can exercise no influence. Excite that condition of the central cell othewrise than by the stimulus from without, the perception does not fail to ensue: a blow on the eye produces flashes of light; on closing the eyes after looking at the sun a spectrum of it remains, which, as it slowly fades away, may be brightened and darkened alternately for a time by pressing the eye and removing the pressure; a disturbance of the circulation in the auditory ganglia gives rise to noises in the ears: in fact, all the senses may be excited subjectively. The reason is evident: because the perception depends upon the special nature of the central cells and the mechanism by which the stimulus is conveyed to them. Accordingly, the effect of any stimulus capable of affecting one of the special senses is of the same kind as that produced by its proper stimulus: thus the effect of the electric stimulus on the optic ganglia is to cause light; on the olfactory nerves, some kind of smell; on the gustatory nerves, some kind of taste. This is as clear evidence as any one can desire of specific differences between nervous cells which to the eye often appear exactly alike. That man is by nature thus limited to the reception of certain special impressions through a few avenues, proves how limited must be his knowledge at the best: it may well be that there are many things in nature of which he has not, and cannot have, any kind of knowledge; and that a new sense conferred upon him might alter the whole aspect of the universe.

What is true of the cells of the sensory ganglia is probably no less true of the cells of the higher centres of intelligence. There is reason to assume differences, not merely between the ganglionic cells of one lobe of the brain and those of another, but also between one cell or group of cells and another cell or group of cells. The law of progress from the general to the special in development does not cease its action suddenly at the cerebral hemispheres. The philosopher is not, it is true, in possession of more senses than the savage; but he unquestionably has more numerous and complex convolutions, and, therefore, many more ganglionic cells in the primary centres of intelligence. By intending his mind to the realities of external nature he acquires information through the senses, but his intelligence reacts advantageously upon the senses; he constructs instruments which extend their power of observation,—thus acquires, as it were, new artificial senses, so that hitherto obscure relations of external nature are disclosed to him, and he attains to more special and complex relations therewith. If cortical cells of a higher quality than the savage has, do not answer to this increased speciality and complexity, it is contrary to all the analogy of organic development, as it is also an unintelligible freak of nature to have crowded the hemispherical ganglia with cells which are mere repetitions of one another.

(*d*) *Pathological Evidence.*—This will be brought forward in detail at a later period. Let it suffice here to say, that Schroeder van der Kolk can venture to assert that he never failed to discover pathological changes, and that, when intellectual disorder especially has existed in madness, he has found the cortical layer under the frontal bones to be darker coloured, more firmly connected with the pia mater, or softened; in melancholia, on the other hand, where the feelings chiefly are excited or depressed, the pathological changes were found rather in the convolutions of the upper and hind lobes. In old age, when the memory fails, he thinks that the cells of the cortical layer are visibly atrophied. The very many and various disorders to which the memory is liable, failures of every possible degree and character, which can only be described by being given in detail, surely indicate in no uncertain way the different nature of different cells in the cortical layer.

Thus much, then, by way of setting forth facts which will not easily be discredited. What is the unavoidable conclusion? That no true scientific result can possibly proceed from the vague and general employment, without further discrimination, of mental action to embrace phenomena of such manifestly different nature. If the psychologists had duly minded the old but wholesome maxim, that whosoever distinguishes well teaches well, they might have found even in the revelations of self-consciousness, when interpreted without bias, those distinctions which an investigation into the physiology of the nervous system in man and animals establishes beyond all question. But the metaphysical conception of mind, the abstraction made into an entity, has overridden all discerning observation, and, blending well-marked differences into a vague obscurity, has constructed a loose system of undefined words in place of an exact and positive science of facts. Instead of mind being, as assumed, a wondrous entity, the independent source of power and self-sufficient cause of causes, an honest observation proves incontestably that it is the most dependent of all the natural forces. It is the highest development of force, and to its existence all the lower natural forces are indispensably pre-requisite.

It is most needful, if we would avoid hopeless confusion and often-made error, once for all to form a just and definite conception of what we mean by mental force, and of its position in nature. To deal with mind apart from the consideration of the matter through the changes of which it is manifested is truly no less vain and absurd than it would confessedly be to attempt to handle electricity and gravitation as forces apart from the changes in matter by which alone we know them. As there are different kinds of matter, so there are different modes of force, in the universe; and as we rise from the common physical matter in which physical laws hold sway up to chemical matter and chemical forces, and from chemical matter again up to living matter and its modes of force, so do we rise in the scale of life from the lowest kind of living matter, with its corresponding force or energy, through different kinds of histological elements, with their corresponding energies or functions, up to the highest kind of living matter and corresponding mode of force with which we are acquainted, viz. nerve element and nerve force. But, when we have got to nerve element and nerve force, it behoves us not to rest content with the general idea, but to trace, with attentive discrimination, through the nervous system the different kinds of nervous cells, and their different manifestations of energy. So only shall we obtain the groundwork of a true conception of the relations of mind and the nervous system.

The chief feature to be noted in this upward transformation of matter and correlative metamorphosis of force is, that the exaltation or transpeciation on each occasion represents an increased speciality of elements, and a greater complexity of combinations in a smaller space: all exaltation of matter and force is, as it were, a concentration thereof. As one equivalent of chemical force corresponds to several equivalents of inferior force, and one equivalent of vital force to several equivalents of chemical force; so in the scale of tissues the higher kind represents a more complex elementary constitution, and a greater number of simultaneously acting forces, than the kind of tissue below it in dignity. If we suppose a higher tissue to undergo decomposition, or retrograde metamorphosis of its matter, with which must necessarily coincide a resolution of its energy into lower modes, then we might say that a single monad of the higher tissue, or one equivalent of its force, would equal in value several monads of the lower kind of tissue, or several equivalents of its force. The characteristic of living matter is the complexity of combinations and the variety of elements in so small a compass that we cannot yet trace them; and in nervous tissue this complication and concentration is carried to its highest pitch. Nervous tissue with its energy is, therefore, dependent for its existence on all the lower kinds of tissue that have preceded it in the order of development: all the force of nature could not develop a nerve-cell directly out of inorganic matter. The highest energy in nature is really the most dependent; in the fact that it is so dependent, that it implicitly contains the essence or abstraction of all the lower kinds of energy, lies the reason of the powerful influence which it is able to exercise over all the lower forces that are subservient to its evolution. As the man of genius implicitly contains humanity, so nervous element implicitly contains nature.*

What is the progress or *nisus* that is manifest on surveying nature as a whole? Is it not the struggle to arrive at consciousness, to attain to self-communion? In the series of her manifold productions man was, so to speak, says Goethe, the first dialogue that Nature held with God. Every poet, then, who is sensitive to a hitherto unrevealed subtlety of human feeling, every philosopher who apprehends and reveals a hitherto unobserved relation in nature, is, each in his place, aiding the onward progress; in his art nature is undergoing evolution; in him the world is, more or less, *regenerate.*

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* For the further development of this view of life, I may refer to an article on the "Theory of Vitality," in the *British and Foreign Med.-Chir. Review*, October, 1863.

> "To whom the wingèd hierarch replied :—
> O Adam, one Almighty is, from whom
> All things proceed, and up to Him return,
> If not depraved from good, created all
> Such to perfection, one first matter all,
> Endowed with various forms, various degrees
> Of substance, and in things that live, of life;
> But more refined, more spirituous, and pure;
> As nearer to Him placed, or nearer tending,
> Each in their several active spheres assigned,
> Till body up to spirit work, in bounds
> Proportioned to each kind. So from the root
> Springs higher the green stalk, from thence the leaves
> More airy, last the bright consummate flower
> Spirits odórous breathes: flowers and their fruit,
> Man's nourishment, by gradual scale sublimed,
> To vital spirits aspire, to animal,
> To intellectual; give both life and sense,
> Fancy and understanding; whence the soul
> Reason receives, and reason is her being,
> Discursive or intuitive; discourse
> Is oftest yours, the latter most is ours,
> Differing but in degree, of kind the same."
>
> *Paradise Lost*, B. v.

CHAPTER III.

THE SPINAL CORD, OR TERTIARY NERVOUS CENTRES; OR NERVOUS CENTRES OF REFLEX ACTION.

OMITTING for the present any mention of the organic nervous centres of the sympathetic system—first, because very little is definitely known about them; and, secondly, because something will be said of them when treating of the Passions—we go on to show forth the functions of the spinal cord. A large part of human activity notably takes place without any voluntary control, or even without any consciousness on the part of the individual; and of these unconscious or involuntary actions a great part is as plainly due to the independent power of reaction which the ganglionic cells of the spinal cord have. Such automatic action of the spinal cord, manifest enough in man, but still more so in the lower animals, may be illustrated both from the animal kingdom and from the phenomena of human life.

When the earliest actions of the new-born infant are observed, it is plain that, like the movements of the fœtus within the mother's womb, or the movements of many of the lower animals, they are simply reflex to impressions, and take place without will, or even without consciousness. The anencephalic infant, in which absence of brain involves an absence of consciousness, not only exhibits movements of its limbs, but is capable also of the associated reflex acts of sucking and crying. A decapitated frog, to the thigh of which acetic acid has been applied, makes certain movements for the purpose of wiping off the acid; and if the head of a frog, which is clinging to the female at the season of copulation, be cut off, the animal still holds on to her, nay, if its paw be further cut off, clings to her with its bloody stump. The spinal cord is plainly, then, not only a centre of irregular reflex movements, but it is also a centre of co-ordinate or so-called designed actions. Pflüger wetted with acetic acid the thigh of a decapitated frog over its internal condyle: it wiped it off with the dorsal surface of the foot of the same side: he thereupon cut off the foot, and applied the acid to the same spot: the animal, as though it were deceived, as the man who has lost a limb at first is, by an eccentric sensation, would have wiped it off again with the foot of that side, but of course could not. After some fruitless efforts, therefore, it ceased to try in that way, seemed unquiet, "as though it were searching for some new means," and at last it either made use of the foot of the leg which was left, or it so bent the mutilated limb that it succeeded in wiping it against the side of its body. So much was Pflüger impressed by this wonderful adaptation of means to an end in a headless animal, that he actually inferred that the spinal cord, like the brain, was possessed of sensorial functions. Others, who would scarce admit the supposition to be true of man, have thought that it might be so of some of the lower animals. Instead of rightly grounding their judgment of the complex phenomena in man on their experience of the simpler instances exhibited by the lower animals, they applied to the lower animals their subjective misinterpretation of the complex phenomena in man.7)

It is obviously quite possible to draw another inference from Pflüger's experiment: that the so-called design of an act does not necessarily witness to the co-existence of will, forethought, or consciousness; that actions "having the semblance of predesigning consciousness" may, nevertheless, be unattended with consciousness. No doubt there is a definite purpose in the movements which the maimed frog makes, as there is definite purpose in the movements of the anencephalic infant's lips, or in the respiratory movements of man or animal; but in all these instances the co-ordinate activity is the result of an innate nervous constitution, an original endowment of the nervous centres. Accordingly we see that the frog which has lost its leg acts as if the limbs were still there, which, were there intelligent consciousness, it plainly should not, and only employs other means when the irritating action of the stimulus continues unaffected by its efforts. As in certain morbid states of the human organism the continuance of an irritation, which at first only causes slight reflex action, may produce a more general involuntary reaction or convulsions; so in the frog, the enduring stimulus, which has not been affected by the customary reflex movement, now gives rise to those further physiological movements which would have been made use of had the frog still possessed its brain. In the constitution of the spinal cord are implanted the capabilities of such co-ordinate energies; and the degree of the irritation determines the extent of the activity. But this takes place without consciousness; and all the design which there is in the movement is of the same kind as the design which there is in the formation of a crystal, or in the plan of growth of a tree. A crystal cannot overstep the laws of its form, nor can a tree grow up into heaven; the particles of the crystal aggregate after a certain definite plan, and thus strictly manifest design. Are we, then, to assume that, because of the design, there is consciousness in the forming crystal or the growing tree? Certainly not; and yet it is to such extreme conclusion that the arguments of those who look upon the so-called design of an act as testifying to consciousness logically lead. The design of an act is nothing else but the correlate in the mind of the observer of the law of the matter in nature; and each observer will see in any event exactly that amount of design which he brings with him the faculty of seeing.

Much fruitless theory would have been avoided if the real nature of design had been kept distinctly in mind. The notion that the soul works unconsciously in the building up of the organism, which has at different times been so much in fashion, rests entirely upon the assumption that an intelligent principle or agent must be immanent in organic matter which is going through certain definite changes. But if in the formation of an organ, why not also in the formation of a chemical compound with its definite properties? The function is the necessary result of a certain definite organic structure under certain conditions, and in that sense must needs minister to the furtherance of its well-being. But an organic action, with never so beautifully manifest a design, may, under changed conditions, become as disastrous as it is usually beneficial; the peristaltic movements of the intestines, which serve so essential a purpose in the economy, may, and actually do, in the case of some obstruction, become the cause of intolerable suffering and a painful death. Where, then, is the design of their disastrous continuance? Whatever design we recognise is really an idea that is gradually formed in our minds from repeated experiences of the law of the matter. Any other kind of design can exist only in the creative mind; and into such questions science cannot enter. Those who would rashly venture to do so might call to mind and weigh the sagacious remark of Spinoza, that the idea of a perfect God is incompatible with the conception of such working after an aim, "because God would then desire something which He was without."

It will not be amiss to take note here of the very different way in which we are in the habit of regarding dead matter and living matter. In dead matter the form is looked upon as the attribute of the matter, whereas, on the other hand, in living bodies the matter is treated as the attribute of the form: in inorganic nature the matter is the essential thing, in the organic creation the form is all in all. But to neglect the exact consideration of the conditions and combinations of matter, as determining organic form, is not less mischievous than it is to concentrate all attention upon the matter in inorganic nature. What are inseparably joined together in nature let us not vainly attempt to put asunder. Mindful of this maxim we shall not be so much tempted to fall back upon that vague and shifting doctrine of final causes which has done so great harm in science, or, as Bacon has it, has strangely defiled philosophy, and which, though often rejected absolutely, and now banished from the more advanced sciences, still works injuriously in biology, where so much is yet recondite and obscure. (2) The human understanding can indeed best impose its own rules on nature there where the truth is most inaccessible and least known. Not only does it in biology look for a final cause answering to its own measure, but, having found this, or created it, proceeds straightway to superadd its own attribute of consciousness, so that, wherever evidence of design is met with, be it only in the function of the spinal cord of a decapitated frog, there consciousness is assumed. Is it not truly a marvel that some teleologist has not yet been found to maintain that the final cause of the moon is to act as a "tug" to the vessels on our tidal rivers?

There can be no difficulty in admitting that the spinal cord is an independent centre of so-called aim-working acts that are not attended with consciousness. It is the centre, however, not only of co-ordinate action the capability of which has been implanted in its original constitution, but also of co-ordinate action the power of which has been gradually acquired and matured through individual experience. Like the brain, the spinal cord has, so to speak, its memory: the reaction which it displays, in consequence of a particular impression conveyed to it from without, does not vanish issueless, leaving the ganglionic cells unmodified after its force has been expended. With the display of energy there is a coincident change or waste of nervous element; and, although a subsequent regeneration or restoration of the statical equilibrium by the quiet process of nutrition takes place, yet the nutritive repair, replacing the loss which has been made, must plainly take the form or pattern created by the energy and coincident material change. Thereby the definite activity is to some extent realized or embodied in the structure of the spinal cord, existing there for the future as a motor residuum, or as, so to speak, a *potential* or *abstract* movement; and accordingly there is a tendency to the recurrence of the particular activity—a tendency which becomes stronger with every repetition of it. Every impression which is made leaves behind it, therefore, its trace or residuum, which is again quickened into activity on the occasion of an appropriate stimulus: the faculties of the spinal cord are thus gradually formed and matured. When a series or group of movements are, after many voluntary efforts, associated, they notably become more and more easy, and less and less separable, with every repetition, until at last they are firmly fixed in the constitution of the cord, become a part of the faculty of it, and may be accomplished without effort or even without consciousness: they are the *secondary* or *acquired automatic* acts, as described by Hartley.(3) In this way walking becomes so far a reflex or automatic act that a man in a profound abstraction may continue to walk without being conscious where he is going, and find himself, when he wakes from his reverie, in a different place from that which he intended to visit. In that form of epilepsy known as the *petit mal*, an individual sometimes continues automatically, whilst consciousness is quite abolished, the act which he was engaged in when the attack seized him: a shoemaker used frequently to wound his fingers with the awl as he went on with his work during the attack, and on one occasion walked into a pond of water during the suspension of consciousness; and a woman whom Schroeder van der Kolk knew, continued eating or drinking, or the occupation she was about, being quite unconscious on recovery of what had happened. In fact, if we attend to our ordinary actions during the day, it will be surprising how small a proportion of them are consciously willed, how large a proportion of them are the results of the acquired automatic action of the organism. It is most certain that the faculties of the spinal cord are, for the most part, not inborn in man, but are gradually built up by virtue of experience and education; in their formation they illustrate the progress of human adaptation to external nature.

It is true that the capability of certain associated voluntary movements, or the germ of such capability, does appear to exist as an innate endowment of the spinal cord even in man, whilst in the lower animals it is very evident. As the young animal, directly it is born, can sometimes use its limbs with complete effect, or as the infant, previous to any experience, is capable of that association or catenation of movements necessary to crying, breathing, or coughing, so likewise does there appear to be, as Mr. Bain argues,* the germ of a locomotive harmony in the original conformation of the nervous centres of man. Not only does the analogy of the lower animals favour the original existence of such an associating link, but the tendency to an alternate action of the lower limbs, and of the two sides of the body, observably precedes any acquisition of experience. There is, furthermore, a great proneness to the involuntary association of the motions of corresponding parts of the two sides of the body; and, as Müller has observed, the less perfect the action of the nervous system in man, or the less developed volition is, the more general are the associate movements. It would be a fruitless task, however, to attempt to fix the value of this pre-established arrangement in man, where it is obviously rather a potentiality than an actuality; and, for all practical purposes, we must view the faculties of his spinal cord as acquired. The child certainly has the capability of learning to walk, but the actual process of learning involves the expenditure of much time and energy, and represents a progressing development of the spinal cord: it is the faculty thereof in the making. Of course it is not to be supposed that the spinal centres of themselves ordinarily suffice for all the complicated movements of walking, although they may do so: all that is claimed is, that they are the automatic centres of certain associate movements, which have been acquired, and which constitute a large part of our daily action.*

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* The Senses and the Intellect, 2d ed. It has long been distinctly recognised as a general law that when a moderate stimulus excites several motor nerves, these are physiologically connected; first, inasmuch as all the fibres going to a particular muscle are simultaneously excited, so that partial movement of the muscle does not take place; secondly, as the regular reflex activity implicates such muscles as are functionally co-ordinated, the associated action of which produces certain physiological effects—*e.g.* coughing, sneezing.

This power of co-ordinate action, which the spinal centres acquire by assimilation of the influence of the individual's surroundings and respondent reaction thereto, is plainly a most useful, as it is a most necessary, provision of nature. For if an act became no easier after being done several times, if the careful direction of consciousness were necessary on every occasion to its accomplishment, it is evident that the whole activity of a lifetime might be confined to one or two deeds—that no progress could take place in development. A man might be occupied all day in dressing and undressing himself; the washing of his hands or the fastening of a button would be as difficult to him on each occasion as to the child on its first trial; and he would furthermore be completely exhausted by his exertions. For while secondary automatic acts are accomplished with comparatively little weariness—in this regard approaching the organic movements, or the original reflex movements—the conscious efforts of the will soon produce exhaustion. A spinal cord without memory would simply be an idiotic spinal cord incapable of culture—a degenerate nervous centre in which the organization of special faculties could not take place. It is the lesson of a good education so consciously to exercise it in reference to its surroundings that it shall act automatically, in accordance with the relations of the individual in his particular walk of life.

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* Schroeder van der Kolk, after saying that the production of harmonized movement is due to the ultimate connexion of certain groups of ganglionic cells in the spinal cord, goes on to say—"It has always been incomprehensible to me, how any one could ever have referred it (co-ordination) to the cerebellum. If the cause of this co-ordination lay in the cerebellum, no horizontal reflex movements could take place in a decapitated frog."—*On the Minute Structure of Spinal Cord and Medulla Oblongata*, p. 72. The supposition that the cerebellum is the centre of co-ordination is now, in fact, abandoned as untenable. There never was any real scientific evidence to support it, while there was positive evidence against it.—See *Versuch einer Physiologischen Pathologie der Nerven*, von G. Valentin, 1864, vol. ii. p. 68.

The phenomena of secondary automatic action may well serve to exhibit the true mode of origin and the nature of what we call design. It is here observably an acquisition that is gradually organized in respondence to particular experience, and, representing as it does the acquired nature of nervous element, its manifestation is the simple result of the constitution of the material substratum, just as the properties of any chemical element are the unavoidable result of its nature. That means are adapted to the production of an end in the phenomena of life, is but another way of saying that what we please to call life exists; for if means were not adapted to an end there could plainly be no end; and if we choose to assume a certain result to be the end of certain means, then we are but saying that certain things have, according to our experience, certain definite properties. In the building up of the secondary automatic faculties of the spinal centres, we are thus able to trace through the course of its formation in individual life that design which we meet with fully formed in the innate faculties of so many animals; but which even in that case has, as we shall hereafter see, been gradually organized through generations. If it be said that the gradual building up of this embodied design into the constitution of the nervous centres is itself an evidence of design, then we can only answer, that such proposition is merely a statement in other words of the fact that things do exist as they do, and add the expression of a conviction that science cannot enter into the councils of creation. If that is not satisfactory to the teleologists, it will be sufficient to recall to them the already given observation of Spinoza, and to congratulate them on their power of diving into " the mysteries of things as if they were God's spies." Were it not well, however, that they should condescend to humble things, and unfold to us, for example, the final cause of the mammary gland and nipple in the male animal?

As the faculties of the spinal cord are built up by organization, so must they be kept up by due nutrition. If not so preserved in vigour, if exhausted by excesses of any kind, the ill effects are manifest in degenerate action; instead of definite co-ordinate action ministering to the well-being of the individual, there ensue irregular spasmodic or convulsive movements, which, though inevitable consequences of the degenerate condition of the nervous centres, serve no good end, but have quite lost their beneficial design.* Mr. Paget has rendered it extremely probable that the rhythmical organic movements, such as those of the heart, of respiration, of the cilia, are due to a rhythmical nutrition; that is, "a method of nutrition in which the acting parts are, at certain periods, raised, with time-regulated progress, to a state of instability of composition, from which they then decline, and in their decline discharge nerve-force." † It is intelligible, therefore, why they are never tired when acting naturally; between every act a repair of composition takes place, and the time of each occurrence of the movement represents the time-rate of nutrition. But the spinal centres are equally dependent on nutrition for the maintenance of their functions; the structural or chemical change produced by the ordinary activity of the day must be repaired during a period of cessation of action. This restoration most likely takes place during sleep; and there is some reason to believe that the periodical action of the spinal centres is, like rhythmical organic movement, dependent upon or closely related to, the time-rate of nutrition. The unconscious quiet manner in which the automatic action of the spinal centres is performed, though in one way or another the work is continuous during waking, might seem at first sight to render no cessation of action necessary; but a little reflection shows that here, as elsewhere, the expenditure of force must be balanced by a corresponding supply. If no rest be allowed, the exhaustion is evinced, first, in an inability to accomplish successfully the most delicate or complex acquired associate movements—in a loss, that is, of design; then in trembling incapacity, which, if the degeneration increases, may pass on to actual spasmodic movement. Therein we have sure evidence that the constitution of the nervous element has suffered from the drain of activity.

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* They have, no doubt, their design quite as much as the healthy movements, in so far as they accomplish what they cannot help doing, their destiny—in other words, fulfil the law which necessitates them.

† Croonian Lecture before the Royal Society, 1857.

A reflection which occurs, in considering the organic mechanism by which the action and reaction between the individual and nature take place, is as to the disproportionate exhibition of force by the organism to the force of the simple impression which may happen to be made upon it. How, with due regard to the principle of the conservation of force, do we account for this seeming generation of energy? In the first place, the central ganglionic cell is not a simple impassive body, which merely reflects or passes onwards a received current of activity, without affecting it or being affected by it: on the contrary, it is the complexly constituted, supremely endowed centre in which force is released or evolved on the occasion of a suitable stimulus; and that which is perceived, as it were, in the spinal cord is not the actual impression made upon the afferent nerve, but it is the effect produced in the particular central nervous cell or cells. Is it not plain enough how this force or energy is evolved, or, as it were, unfolded in the cell? By the disturbance of the statical equilibrium of an intensely vital structure; by a change of the material into lower kinds, or a degeneration of it, and a correlative resolution of its force into lower modes and larger volumetrical display. There is not any actual generation of force, but only a transformation of the high quality of latent force which the nervous monad inplies into actual force of a lower quality and larger display. Consider what has been previously said as to the nature of nervous element and its position in the universe: it will then be sufficiently evident what manner of process it is that takes place. Slowly and, as it were, laboriously, by a steady appropriation and ascent through many gradations of vitality, does organic element arrive at the complex and supreme nature of nervous element; quickly and easily does nervous element give back force and matter to nature, in the rapid resolution which the accomplishment of its function implies.

Thus much on the inherent force of the spinal cord as a nervous centre. In the second place, bear in mind the nature of its acquired faculties, and the great expenditure of force made upon its education. In the registration of impressions made upon it, in the assimilation of their residua, there is slowly embodied a quantity of energy as an organic addition of power to it; force is being stored up in the gradual organization of its faculties. The exhaustion which we feel from our efforts to acquire any particular skill of movements, as in learning to dance, the labour given to the frequent voluntary repetition of the stimulus and adapted reaction thereto, until by practice the definite relation has been established, and the desired skill acquired;—these testify to the expenditure of so much force which has been laid up as statical power in the constitution of the ganglionic cells of the cord, and for the future renders possible a group of associated movements in answer to a moderate, and, as might often seem, disproportionate stimulus from without. Like the brain, the spinal cord lays up good store of power in its memory. Man's life truly represents a progressive development of the nervous system, none the less so because it takes place out of the womb instead of in it. The regular transmutation of motions which are at first voluntary into secondary automatic motions, as Hartley calls them, is due to a gradually effected organization; and we may rest assured of this, that co-ordinate activity always testifies to stored-up power, either innate or acquired.

The way in which an acquired faculty of the parent animal is sometimes distinctly transmitted to the progeny as a heritage, instinct, or innate endowment, furnishes a striking confirmation of the foregoing observations. Power which has been laboriously acquired and stored up as statical in one generation manifestly in such case becomes the inborn faculty of the next; and the development takes place in accordance with that law of increasing speciality and complexity of adaptation to external nature which is traceable through the animal kingdom, or, in other words, that law of progress from the general to the special in development which the appearance of nerve force amongst natural forces and the complexity of the nervous system of man both illustrate. As the vital force gathers up, as it were, into itself inferior forces, and might be said to be a development of them, or, as in the appearance of nerve force, simpler and more general forces are gathered up and concentrated in a more special and complex mode of energy; so again a further specialization takes place in the development of the nervous system, whether watched through generations or through individual life. It is not by limiting our observation to the life of the individual, however, who is but a link in the chain of organic beings connecting the past with the future, that we shall come at the full truth; the present individual is the inevitable consequence of his antecedents in the past, and in the examination of these alone do we arrive at the adequate explanation of him. It behoves us, then, having found any faculty to be innate, not to rest content there, but steadily to follow backwards the line of causation, and thus to display, if possible, its manner of origin. This is the more necessary with the lower animals, where so much is innate.

And now, having done with the general functions of the spinal cord as an independent nervous centre ministering to the animal life, let us add that these were distinctly recognised by the physiologist long before the anatomist was in a condition to give the physical explanation. It is only recently that the nerve-fibres which pass to or from the cord have been proved to be connected with the multipolar cells of its grey substance; and this so plainly as to justify the belief that an isolated apolar nervous cell does not exist in the spinal cord or brain. For the conveyance of an impression to the grey centres, and for the passage of the reacting force outwards, there is thus revealed a definite physical path, along which the current of activity travels. From the cells with which nerves are connected, again, other processes go to join neighbouring cells, and thus, forming a connecting path between them, enable them to act together: hundreds of ganglionic cells are yoked together by such anastomoses, and, functionally co-ordinated thereby, represent the centres of innervation of corresponding systems of motor nerves. By similar anastomoses the ganglionic cells of different nervous centres are connected, and thus a means is afforded for the communication of the activity of one centre to another. Many, therefore, are the channels by which the activity excited in the nerve-cell by the stimulus of the afferent nerve may be disposed of: it may at once be reflected on to an efferent nerve, and pass into muscular motion; or it may pass to other interconnected cells, and, acting thus upon a system of nerves, produce associated movements, either such as proceed from the cord nearly on the same level as the afferent nerve enters, or such as proceed from a different level; or, lastly, it may pass upwards, and excite the higher functionally co-ordinated centres.

To Pflüger belongs the merit of having attempted to systematise the laws of the reflex movements. They are:—1. *The law of simultaneous conduction for one-sided reflex movements.* When a reflex movement takes place only on one side of the body in consequence of a stimulus, it is always on the same side of the body as the irritation of the afferent nerve; the reason being probably that the motor nerves proceed from ganglionic cells which are in direct connexion with the stimulated afferent nerves. 2. *The law of symmetry of reflex action.* When a stimulus has produced reflex movements on one side, and its continuance or its further extension in the spinal cord produces movements of the opposite side, then the corresponding muscles only of this side are affected. This is owing no doubt to the commissural system, which connects together the corresponding ganglionic cells of the two halves of the cord. 3. *The unequally intense reflex action of the two sides* in the event of both being affected. When the reflex action is stronger on one side than upon the other, the stronger movements take place upon the side of the irritation. 4. *The law of irradiation of reflex action,* by which an extension of reflex action takes place from the nerves in which it first appears to neighbouring ones, owing to the communications between the different systems or groups of ganglionic cells. When the excitation of an afferent *cerebral* nerve is transferred to motor nerves, we observe that the roots of both sorts of nerves are placed nearly upon the same level in the central organ, or that the motor nerve lies a little behind or below, never in front of or above, the afferent nerve. If the reflex action spreads further, the way of irradiation is *downwards* to the medulla oblongata; stimulation of the optic, for example, produces contraction of the iris. In the spinal cord the primarily-affected motor nerve lies nearly on the level of the stimulated sensory nerve. But if the reflex action spreads, then it passes *upwards* towards the medulla. When the irritation has arrived at the medulla, then it may pass downwards again. 5. The reflex action produced by the irritation of a sensory nerve can only appear in three places, whether one-sided or occurring on both sides of the body. (*a*) It appears in the motor nerves which lie nearly on the same level with the excited sensory nerve. (*b*) If reflex action implicates the motor nerves on a different level, these motor nerves are constantly such as spring from the medulla oblongata: tetanus and hysterical convulsions, in consequence of local irritations, furnish examples. (*c*) The reflex action affects the muscles of the body generally; the principal focus of irradiation thereof being the medulla oblongata.

I proceed next to indicate briefly the causes which affect the functional activity of the spinal cord:—

1. As an original fact, the ganglionic cells may have a greater or less stability of composition. It sometimes happens that a child is born with so great a natural instability of nervous element, that on the occasion of very slight irritation the most violent convulsions ensue. Or the evil may be less serious, and the individual may be equal to the ordinary emergencies of a quiet, favourably spent life; but there is an absence of that reserve power necessary to meet the extraordinary emergencies and unusual strain of adverse events. When, therefore, an unaccustomed stress is laid upon the feeble nervous element, it is unequal to the demand made upon it, and breaks down into a rapid degeneration. The most common cause of this innate feebleness, which is marked by an excessive irritability and is truly an irritable weakness, is an unfortunate inheritance, the curse of a bad descent: any sort of disease of the nervous system in the parent seems to predispose more or less to this ill condition of the child, the acquired deterioration of its parent becoming its inborn organic feebleness.

The degeneration of nervous element in the ganglionic cells reveals itself in a disturbance of the co-ordinate or aim-working activity which, as we have already seen, marks the highest development of its power. Convulsions are the sure signs of a weakness or lowered vitality of nervous element—a defect which, though we cannot yet ascertain its exact nature, certainly implies an unstable equilibrium of its organic constitution. Each central nervous cell exists in close relations, physical and physiological, with other nervous cells; when, regardless of these relations, it reacts directly outwards on its own account, it is very much like an individual in a social system who, by reason of madness, is unable to maintain his due social relations.

Not only, however, may an excess of irritability be a defect in the nature of the ganglionic cell, but it may be defective also by reason of a great insensibility of nature and want of power of assimilation. In congenital idiots the central cells of the cord do plainly sometimes partake of the degeneracy of the brain, and are idiotic also; they are incapable of receiving impressions with any vividness, and of retaining the traces or residua of such as they do receive. Spasms of the limbs, sometimes limited to the toe, to one arm or leg, at other times more general; contractions of a foot, or of the knees to such degree as to make the heels touch the buttocks; more frequent still, paralytic conditions of varying degree and extent; atrophied limbs, now and then indulging in convulsive movement;—all these morbid states are met with in idiots, and, though in part attributable to the brain, are certainly in part due to degeneration of a spinal cord utterly oblivious of its design or final purpose in the universe. In some cases, in which the morbid degeneration is not so extreme, it is still not impossible to teach such combinations of movements as are necessary for the common work of life. It may be observed incidentally, however, that the easy and rapid way in which those idiots who have by perseverance been taught difficult feats of action—the machine-like exactness and ease of their movements—serves to display the important functions of the spinal cord as an independent nervous centre, in a case in which the influence of the cerebral hemispheres is almost excluded.

2. The functional action of the spinal ganglionic cells may suffer from the too powerful or prolonged action of an external stimulus, or from an activity continued without due interval of rest. The molecular degeneration or waste, which is the condition of functional activity, must be repaired by rest and nutrition; the nerve cell is no inexhaustible fountain of force, but must take in from one quarter what it gives out in another· and, if due time be not allowed for the development of its highly vital structure by assimilation of matter of a lower quality, it is

certain that, notwithstanding the best innate constitution, deterioration must ensue as surely as a fuelless fire must go out. In that degeneration of the spinal cord which sometimes occurs in consequence of masturbation or great venereal excess, one of the first symptoms is a loss of co-ordinating power over the motions of the legs—a loss, in other words, of that which is the last organized faculty of the spinal centre. The startings of the limbs, and the partial contractions of certain muscles which may follow, do not evince increased power, as some have heedlessly fancied, but are the incoherent manifestations of a degenerate instability of nerve element. When such a morbid condition of things is brought about, there is necessarily a failure in the power of the ganglionic cells to receive and assimilate impressions: hence it is that in general paralytics, in whom the memory of each independent nervous centre is decayed, there is not only an inability to accomplish successfully the actions to which they have been accustomed—as, for example, an inability of a tailor, whom from his conversation one would deem quite capable of his work, to sew; but there is also the impossibility of teaching them new combinations of movements. In other sorts of lunatics this is often possible: though mentally much degenerate, and actually lost for ever to the world, they may by persevering training be made useful in certain simple relations to which they grow and react as automatic machines, their own cerebral hemispheres not interfering; the general paralytics, in whom the disease has advanced so far as to affect the cord, cannot thus be utilized.

3. The supply of blood and the condition of it are manifestly of the greatest consequence to the welfare of the spinal cells. The grey matter of the cord is very richly supplied with capillaries, to the end that there may be a quick renewal of blood ministering to the active interchange that goes on between the ganglionic cell and the nutrient fluid; the enormous expenditure of force implied in nervous function demands such an abundance of supply. When the supply of blood is suddenly cut off, as in the well-known experiments of Stannius, Brown-Séquard, and Schiff, the nervous activity is presently paralysed, and rigor mortis of the muscles ensues. When the supply of blood is soon restored to a part in which rigor mortis has taken place,

as in Brown-Séquard's experiment of injecting warm blood into the stiffened arm of an executed criminal, the muscles presently regain their contractility, and the nerves their irritability. As a complete cutting-off of the blood is paralysis of nerve element, so a deficiency of blood, or of material in it fitted for the nutrition of nerve, is to the extent of its existence a cause of degeneration or instability of nerve element: such deterioration is exhibited by cachetic and anæmic persons in a great irritability, and in a disposition to spasms or convulsions—an acquired condition not unlike that which is sometimes inherited.

The state of the blood may be perverted by reason of the presence of some foreign matter which, whether bred in it or introduced from without, acts injuriously, or as a direct poison on the individual nervous cells. Strychnia notably so affects them that, on the occasion of the slightest stimulus, they react in convulsive activity: while the woorara poison, on the other hand, produces a sort of stupor, or coma, and paralyses all activity. Opium, which usually produces coma in man, produces convulsions in frogs. We might, were it needful, accept these different effects of poisons, which are alike positively injurious to the integrity of nerve element, as evidence that convulsions do not mean strength, are not the result of an increase in the proper vital activity of parts, but the result of degenerate vital action, and the forerunners of paralysis.

There is reason to believe that the presence of too much blood in the spinal cord may be as baneful as an insufficient supply of blood. All the symptoms of disorder of nerve element which accompany anæmia may certainly be produced also by congestion, or hyperæmia. However, this matter will be more properly and more fully considered when we come to the pathology of nerve.

4. The existence of a persistent cause of eccentric irritation, whether the result of injury or disease in some part of the body, may give rise to a morbid state of the spinal nerve-cells by a so-called *sympathetic* or *reflex* action. The convulsions which sometimes take place during teething in children, or owing to the presence of worms in the intestines, are familiar examples of such secondary effect upon a susceptible growing nervous system. It is necessary to distinguish two kinds of effects of this reflex

action—or, perhaps, different degrees of the same kind of effect—namely, a reflex functional modification and a reflex nutritive modification.

The irritation of a decayed tooth may, as is well known, give rise to a contraction of the muscles of one side of the neck, or to a violent facial neuralgia, or to blindness or deafness, all which presently disappear upon the removal of the cause of mischief. A functional derangement only has existed so far. But the irritation of a bad tooth produces a greater and more lasting effect when, as does now and then happen, an abscess in the glands of the neck takes place in consequence of it, and remains an incurable fistula until removal of the scarce suspected cause. Then nutritive derangement has been caused and kept up by the reflex irritation. It must certainly be allowed that the functional disorder, when it alone seems to exist, does testify to some kind of change in the molecular relations of the ganglionic cells; but as the abnormal modification vanishes the moment the real cause of mischief, the bad tooth, is gone, it is scarcely possible to view the disturbed function as evidence of any serious nutritive derangement in the cells. With the continuance of the cause of irritation, the functional disorder undoubtedly may, and is liable to, pass into disorder of nutrition. The relations of these different degrees or kinds of derangement to the morbid cause, however, are such that we might not unfairly represent the sole existing functional derangement as due to a modification of the polar molecules of the nerve element, while the abnormal nutrition may be supposed to mark an actual chemical change in its constitution.

Again, as the spinal centres minister both to our animal life and to our organic life, they necessarily have, in the former case, a periodical function; in the latter case, a continuous function. When, therefore, a morbid condition of the ganglionic cells, as subserving the animal life, exists, the functional derangement will probably be not continuous but intermittent. Thus, in epilepsy, it appears as if the reacting centres must be gradually charged until they reach a certain tension or instability, when the statical equilibrium is destroyed, and they discharge themselves violently. Something of the same kind takes place in the poisonous action of strychnia: a dog so poisoned will fall down in convulsions, but, according to Schroeder van der Kolk, they cease after a time, and the animal seems to be perfectly well; even for so long as an hour it may be touched or stroked without harm; after which the susceptibility again becomes so great, that by simply blowing upon the animal convulsions are reproduced. When, on the other hand, the function of the spinal centres, as ministering to the organic life, is deranged, then the morbid effect will not unlikely be continuous. The experiments of Lister, showing that the movements of the granules in the pigment cells of the frog's skin are under the control of the spinal system, and the investigations of Bernard also, agree to prove that the cerebro-spinal axis not only regulates the contractions of the small arteries, but directly influences the organic elements engaged in nutrition and secretion. Numerous examples have been of old quoted of distant modifications of nutrition in consequence of some irritation of a centripetal nerve: a large secretion of extremely acid gastric juice has been cured by the extirpation of painful piles; ptyalism is sometimes produced by neuralgia, as lacrymation frequently is by neuralgia of the fifth nerve; irritation of the uterus, or of the skin of the breasts, or of the mucous membrane of the vagina will sometimes give rise to the secretion of milk; and menstruation may follow irritation of the ovaries, or the application of warm poultices to the breasts. We witness phenomena due to this reflex nutritive action again in the sympathy which one eye so often exhibits with disease of the other; in the congestion of the eye or the actual amaurosis which sometimes accompanies severe neuralgia; in the paraplegia due to displacement or disease of the uterus; and in many other instances too numerous to be mentioned. Pflüger quotes from Dieffenbach a striking case, which admirably illustrates the effects of an eccentric irritation upon the spinal cord. A young girl fell upon a wine-glass, and cut one hand with a piece of the broken glass; for years afterwards she suffered from violent neuralgic pains and emaciation, with contraction and complete uselessness of the hand. She was afflicted also with severe attacks of epilepsy. On cutting through the cicatrix of the old wound, a minute splinter of glass, which had wounded the nerve, was detected; the nerve was also thickened and hardened. After removal of the glass, the neuralgia and epilepsy disappeared, and the girl recovered the entire use of her hand.

5. Lastly, the severance of the connexion between the brain and the ganglionic cells of the spinal cord seems in some degree to affect their function. When a nerve is cut across in the living body, the peripheral end soon undergoes fatty degeneration, while the central end remains unchanged after years; and this degeneration is not owing solely to the inactivity of the nerve, for it still takes place when the nerve is regularly stimulated, and takes place much less quickly in frogs and cold-blooded animals than in warm-blooded animals. After apoplexy in or about the corpus striatum, Turck professes to have found granular cells in the course of the fibres as they pass downwards, so that such cells were met with in the spinal cord on the opposite side to the seat of disease. It is known, too, that the removal of the brain in the lower animals increases the ease with which reflex movements take place; and there are many cases on record in which the reflex action has been increased in man when disease or injury has interrupted the continuity of the spinal centres with the brain. May we not, then, conclude from such facts that a positive influence is exercised by the brain upon the nutrition of the ganglionic cells of the cord and the nerve fibres which proceed from the cerebro-spinal axis? The inference would be agreeable to what we know of the direct influence of the functional action of the brain upon that of the cord; the reflex acts being in health notably for the most part subordinate to the control of the will. As a guiding influence passes from above downwards when the cerebro-spinal system is ministering to the functions of animal life; so it is not improbable that the brain, in the accomplishment of its function as an organ of organic life, exerts some power which is favourable to the nutrition of the parts which lie below it, and which are the instruments through which it acts. It is true that some have thought to explain in another way the increase in the reflex movements which follows the severance of communication between the brain and cord; they have attributed it to the augmented energy of the spinal centres, and to the concentration of the stimulus, now that a path for the dissipation of its force is cut off. Such theory is not innocent of the vulgar error of

regarding as increased energy that which is truly a diminution or deterioration of the higher vital energy of the part. Has it ever yet happened to any one to discover that the co-ordinate reflex acts were made more energetic or effective by cutting off the influence of the brain? One most necessary function of the brain is to exert an inhibitory power over the nervous centres that lie below it, just as man exercises a beneficial control over his fellow animals of a lower order of dignity; and the increased irregular activity of the lower centres surely betokens a degeneration: it is like the turbulent, aimless action of a democracy without a head.

Such, then, are the disturbing causes which may affect the activity of the spinal cord both as a conducting path and as an independent centre of the generation of nerve-power. When we reflect upon the great proportion of the daily actions of life that are effected by its unconscious agency, we cannot but perceive how most important is the due preservation of its integrity. No culture of the mind, however careful, no effort of the will, however strong, will avail to prevent irregular and convulsive action when a certain degree of instability of nervous element has, from one cause or another, been produced in the spinal cells. It would be equally absurd to preach control to the spasms of chorea, or restraint to the convulsions of epilepsy, as to preach moderation to the east wind, or gentleness to the hurricane. That which in such case has its foundation in a definite physical cause must have its cure in the production of a definite physical change.

So certain and intimate is the sympathy between the individual nerve-cells in that well-organized commonwealth which the nervous system represents, that a local disturbance is soon felt more or less distinctly throughout the whole state. When any serious degeneration of the ganglionic cells of the cord exists there is not only an indisposition or inability to carry out as subordinate agents the commands which come from above; but there is a complaint sent upwards—a moan of discontent or pain reaches the supreme authority. That is the meaning of the feelings of weariness, heaviness, achings of the limbs, and utter lassitude which accompany disorder of the spinal centres; and the convulsive spasms, the local contractions or paralysis of muscles are the first signs of a coming rebellion. If the warnings do not receive timely attention, a riot may easily become a rebellion; for when organic processes, which normally go on without consciousness, force themselves into consciousness, it is the certain mark of a vital degeneration. If the appeal is made in vain, then further degeneration ensues. Not only is there irregular revolutionary action of a subordinate, but there is *pro tanto* a weakening of the supreme authority; it is less able to control what is more difficult of control. When due subordination of parts exists, and the individual cell conforms to the laws of the system, then the authority of the head is strengthened. A foolish despot, forgetting in the pride of his power that the strength and worth of a government flow from and rest upon the well-being of the governed, may fancy that he can safely disregard the cry of the suffering and oppressed; but when he closes his ears to complaints he closes his eyes to consequences, and finally wakes up to find his power slipped from him, and himself entered upon the way of destruction. So is it with the nervous system: the cells are the individuals, and, as in the state, so here there are individuals of higher dignity and of lower dignity; but the well-being and power of the higher individuals are entirely dependent upon the well-being and contentment of the humbler workers in the spinal cord, which do so great a part of the daily work of life. The form of government is that of a constitutional monarchy, in which every interest is duly represented through adequate channels, and in which, consequently, there is a proper subordination of parts.

I have lingered thus long upon the spinal cord, because most of what has been said with regard to its functions may, with the necessary change of terms, be applied to the other nervous centres. A distinct conception of the nature and mode of development of the functions of the spinal centres is indeed the best, is the only adequate, preparation for an entrance upon the study of cerebral action; it is an indispensable pre-requisite to the right understanding of the higher displays of nervous function, and alone fixes the sure basis whereon to build a true mental science.* Any system not so founded follows not the order of development in nature, and must be unstable and insecure: nature herself protests against it with energetic eloquence when she makes, as she unquestionably sometimes does, morbid action of the cells of the cerebral hemispheres vicarious of the morbid action of the spinal cells.*

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* In the "Archiv. für Physiolog. Heilkunde," 1843, there is an excellent paper by Prof. Griesinger, "Ueber psychische Reflexactionen, mit einem Blick auf das

NOTES.

[1] (*p.* 64).—Pflüger compares the movements of a decapitated animal with those of a sleeping man, making the movements in both to be conscious. He tickled the right nostril of a sleeping boy, and the lad rubbed it with his right hand: when Pflüger tickled the left nostril the lad rubbed it with his left hand. If he held the sleeper's right hand, without waking him, and tickled his right nostril, the boy first made attempts with his right hand to rub it, but when this did not succeed, and the irritation continued, he then made use of the left hand.

For a fuller discussion of the assumed consciousness of the spinal cord I must refer to my review of Mr. Bain on the "Senses and the Intellect," in the *Journal of Mental Science* for January, 1865, pp. 558, 559. I will only now add a quotation from Spinoza, as translated by M. Saisset. "Personne, en effet n'a déterminé encore ce dont le corps est capable; en d'autres termes personne n'a encore appris de l'expérience ce que le corps peut faire et ce qu'il ne peut pas faire, par les seules lois de la nature corporelle et sans recevoir de l'âme aucune détermination." "This is not astonishing," he adds, "as no one has sufficiently studied the functions of the body," and instances the marvellous acts of animals and somnambulists—"toutes choses qui

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Wesen der psychischen Krankheiten;" and another in the same Journal for 1854, "Neue Beiträge zur Physiologie und Pathologie des Gehirns."

* I cannot forbear quoting here the appropriate words of Mr. J. S. Mill. After saying that it is not likely that the direct employment of mathematics will be available to any great extent in the achievements yet to be effected in scientific generalization, he adds: "But the process itself—the deductive investigation of nature, the application of elementary laws generalized from the more simple cases to disentangle the phenomena of complex cases, explaining as much of them as can be so explained, and putting in evidence the nature and limits of the irreducible residuum, so as to suggest fresh observations preparatory to recommencing the same process with additional data; *this* is common to all science, moral and metaphysical included; and the greater the difficulty, the more needful is it that the inquirer should come prepared with an exact understanding of the requisites of this mode of investigation, and a mental type of its perfect realization."—*Examination of Sir W. Hamilton's Philosophy.*

montrent assez que le corps humain, par les seules lois de la nature, est capable d'une foule d'opérations qui sont pour l'âme jointe à ce corps un objet d'étonnement. . . . . J'ajoute enfin que le mécanisme du corps humain est fait avec un art qui surpasse infiniment l'industrie humaine." The associating link of many movements—as, for example, of those of the heart, of the eye, of breathing—plainly exists in the conformation of the nervous centres; the wisdom or design is exhibited in the primary arrangement, whereby the reactions of the organism necessarily following do, *as a rule*, minister to the furtherance of its well-being.

[2] (*p.* 66).—"And therefore it was a good answer," says Bacon, "that was made by one who when they showed him hanging in a temple a picture of those who had paid their vows as having escaped shipwreck, and would have him say whether he did not now acknowledge the power of the gods, 'Ay,' asks he again, 'but where are they painted that were drowned after their vows?'" Speaking of final causes, upon which the human understanding falls back, he says that they "have clearly relation to the nature of man rather than to the nature of the universe; and from this source have strangely defiled philosophy."—*Nov. Org.* Aphorism xlviii.

[3] (*p.* 67).—"After the actions which are most perfectly voluntary have been rendered so by one set of associations, they may, by another, be made to depend upon the most diminutive sensations, ideas, and motions, such as the mind scarce regards, or is conscious of; and which, therefore, it can scarce recollect the moment after the action is over. Hence it follows that association not only converts automatic action into voluntary, but voluntary ones into automatic. For these actions, of which the mind is scarce conscious, and which follow mechanically, as it were, some precedent diminutive sensation, idea, or motion, and without any effort of the mind, are rather to be ascribed to the body than the mind, *i.e.* are to be referred to the head of automatic action. I shall call them automatic motions of the secondary kind to distinguish them from those which are originally automatic, and from the voluntary ones; and shall now give a few instances of this double transmutation of motions, viz. of automatic into voluntary, and of voluntary into automatic." He instances the manner in which children learn, and especially the way we learn to speak, to play on the harpsichord, &c. "The doctrine of vibrations explains all the original automatic motions; that of association, the voluntary and secondarily automatic ones."—Hartley's *Theory of the Human Mind*, edited by Priestley, pp. 32, 39.

CHAPTER IV.

SECONDARY NERVOUS CENTRES, OR SENSORY GANGLIA; SENSORIUM COMMUNE.

THE different collections of grey matter which exist in the medulla oblongata, and at the base of the brain, the continuations of the grey matter of the spinal cord, consist chiefly of the nervous centres of the higher senses, with corresponding centres of motional reaction. Continuing the grey substance as high as the floor of the lateral ventricles, they include the optic thalami, the corpora striata, the corpora quadrigemina, and the ganglionic nuclei of the nerves of the different senses. Any one of the senses may be destroyed by injury to its sensory ganglion as surely as by actual destruction of its organ; blindness is produced by injury to the corpora quadrigemina, smell is abolished by destruction of the olfactory bulbs. These ganglionic centres are thus intermediate between the higher hemispherical ganglia above and the spinal centres below them; to those they are subordinate, to these they are superordinate. In many of the lower animals, as already pointed out, the brain consists of nothing more than the sensory ganglia, with centres of motional reaction.

The ganglionic centres of the sensorium commune are formed of numerous nerve-cells, which, like those of the spinal cord, are in connexion with afferent and efferent nerves; the afferent nerves, in this case, coming mostly from the organs of the special senses. The impressions which the afferent nerve bring are, therefore, special in kind, as also are the grey nuclei to which they are brought; a progressive differentiation of structure and function is manifest; and we might almost describe the sensorium commune as a spinal cord, the afferent nerves of which are the nerves of the special senses. An exact knowledge of the anatomical relations of the different grey nuclei is still wanting, notwithstanding the patient investigations of Schroeder van der Kolk. All that we are certain of is, that the fibres of the nerves are connected with the cells, as may be most easily seen in the case of the auditory nerve and ganglion; that manifold connexions exist between different nuclei; and that fibres may sometimes be traced from the nucleus of a sensory nerve to a motor nerve, upon which it is known to exert a reflex action. The trigeminus, or fifth nerve, for example, passes from above downwards through the medulla, and in its downward course forms reflex connexions with all the motor nerves of the medulla as it approaches the level of their nuclei; in this way the facial, the glossopharyngeal, the vagus, the spinal accessory, and the hypoglossal receive communications from it. The ganglionic cells of different nuclei also differ in form and size; and Schroeder van der Kolk holds that, as a general rule, at every spot where fibres are given off for the performance of any special function, there fresh groups of ganglionic cells giving origin to them appear. We justly conclude, then, that, as we should *à priori* expect, specially constituted ganglionic cells minister to special functions; that the central cells are, as it were, the workshops in which, on the occasion of a suitable stimulus, the peculiar current necessary for the performance of the specific action is excited. Charged with their proper force during the assimilating process of nutrition it exists in them as statical power, or latent energy; and the condition of unstable vital equilibrium is upset, the force being then discharged, as the Leyden jar is, when a certain stimulus meets with a sufficient tension.

The natural course of a stimulus, all the force of which is not reflected upon an efferent nerve in the spinal centres, is upwards to the sensorium commune, where it becomes the occasion of a new order of phenomena; and, as Pflüger has shown, the law of extension of reflex action excited by a spinal nerve observably is from below upwards to the medulla. Having arrived at the ganglionic cells of the sensorium commune, the stimulus may be at once reflected on a motor nerve, for which there is provision in a direct physical path, and involuntary movements may thus take place in answer to a sensation, just as involuntary movements take place from the spinal centres without any sensation. The ganglionic cells of the sensory centres are unquestionably centres of independent reaction, and give rise to a class of reflex movements of their own. When a man lies with the lower half of his body paralysed in consequence of injury or disease of his spinal cord, the tickling of the soles of his feet will sometimes produce reflex movements of which he is unconscious. When a man lies with no paralysis of his limbs, but with a perfectly sound spinal cord, the sudden application of a hot iron to his foot or leg will give rise to a movement quite as involuntary as that which takes place in the paralysed limb, but, in this case, in answer to a painful sensation; the reaction takes place in the sensory ganglia, and the movement is sensori-motor. Had the hot iron been applied to the paralysed limbs, no movement would have followed, because the path of the stimulus was cut off as completely as the current of the electric stimulus is interrupted when the telegraphic wires are cut across. Take away that part of the brain of an animal which lies above the sensory ganglia, and it is still capable of sensori-motor movement, like as the animal which possesses no cerebral hemispheres is: because the ganglionic cell is a centre of independent reaction—a station on the line which may either send on the message or send off an answer.* (1)

Examples of sensori-motor movements are to be found in the involuntary closure of the eyelids when the conjunctiva is touched, or when a strong light falls upon the eye; in the distortion of the face on account of a sour taste; in the quick withdrawal of the hand when it is touched by something hot; in the cry which excessive pain calls forth; in the motions of sucking which take place when the nipple is put between the infant's lips; in coughing and sneezing; and in yawning on seeing some one else yawn. Illustrations of acquired movements of this class are seen in the adaptation of the walk to the music of a military band, in dancing, in the articulation of words on seeing their appropriate signs, and in many other of the common actions of life of which we are not conscious at the time, but of the necessity of which, were there no power of automatically performing them, we should soon become actively conscious. The instinctive actions of animals fall under the category of consensual acts: without the intervention of any conception, the sensation at once excites the appropriate movement, and the animal is as skilful on its first trial as it is after a life experience. It is true that the instinctive life is extremely limited in man, but sensori-motor action plays a large part in such manifestations of it as are witnessed; in the taking of food the movements of mastication, like the earlier ones of sucking, are in answer to a sensation, as also are some of the co-ordinated movements necessary to the gratification of the instinct of procreation. The adjustment of the eye to distances in man, through a change in the convexity of the lens or the cornea, and an alteration in the direction of the axes of the eyes, which takes place with such marvellous quickness and accuracy, is a consensual act in respondence to a visual sensation, and may serve to give us a good notion of what an instinctive act in an animal is.

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* Mr. James Mill clearly recognised this class of movements. "Innumerable facts are capable of being adduced to prove that sensation is a cause of muscular action," p. 258. After instancing, as examples, sneezing, coughing, the contraction of the pupils, and the movements of the eyelids, he says:—"We seem authorized, therefore, by the fullest evidence, to assume that sensation is the mental cause, whatever the physical links, of a great proportion of the muscular contractions of our frame; and that among those so produced are found some of the most constant, the most remarkable, and the most important of that great class of corporeal phenomena."—*Analysis of the Human Mind*, p. 265.

It was said, when treating of the spinal cord, that its faculties were, for the most part, not innate but acquired; and the same thing may be said of sensations. Sensation is not, as the common use of the word might seem to imply, a certain inborn faculty of constant quantity, but in reality a general term embracing a multitude of particular phenomena that exhibit every degree of variation both in quantity and quality. The sensation of each sense is a gradually organized result or faculty that is matured through experience: the visual sensation of the adult is a very different matter from that of the child whose eyes have recently opened upon the world; Mr. Nunneley's patient, whose sight was restored by operation, held his hands before his face to prevent objects touching his eyes; the wine-taster's cultivated sense is nowise comparable with that of a man who knows nothing of wine; the tactile sensation of the blind man differs *toto cœlo* from that of the man who has always had the full use of his eyes. The complete and definite sensation is slowly built up in the proper nervous centres from the residua or traces which previous sensations of a like kind have left behind them; and the sensation of the cultivated sense thus sums up, as it were, a thousand experiences, as one word often contains the accumulated acquisitions of generations.* Simple as a sensation appears, it is in reality infinitely compound. (2) All that is innate in the different ganglionic centres is a specific power of reaction to certain impressions made upon organs specially adapted to receive them; the waste following activity is restored by nutrition, and a trace or residuum remains embodied in the constitution of the nervous centre, becoming more complete and distinct with each succeeding repetition of the impression: an acquired nature is grafted on the original nature of the cell by virtue of its plastic power. In the common metaphysical conception of sensation as a certain constant faculty what happens is this: the abstraction from the particular is converted into an objective entity which thenceforth tyrannizes over the understanding.

Whether, as some hold, our perception of the form and distance of external objects is due to our muscular experience, or whether, as others maintain, our visual sensation by itself may give the notion of extension and distance, it is certain that our ordinary estimates of distance are very gradually acquired. But it is not so in many animals: the young swallow can seize its small prey with as accurate a skill as the old one after a life experience; and there is a fish that spurts a drop of water at the little insect moving above the surface, and fails not to bring it down: the intuition of distance is obviously in such cases complete and distinct from the first. It is, however, conformable to the law of development from the general to the special in the organic world, that what is innate in some of the lower animals should be acquired by man: the absence of such limitation in his original nature marks his higher freedom. Still it is most interesting to observe how much even he is indebted to original endowment in this very matter of estimating distance. For what is the immediate cause that determines the muscular adjustment of the eye to distance? The act is consensual, or, using the vaguer term, instinctive, in respondence to a visual sensation or picture—an act of which there is no direct consciousness, and over which the will has no direct control. Though the process is confused and uncertain at first, unlike in that regard the process in the lower animals, yet it is not long before the proper muscular adaptations are acquired and definite muscular intuitions organized. Plainly, then, very much is due to the pre-arranged constitution of the nervous centres even in man. And while we assert that sensation is not an inborn faculty of constant value in man, it behoves us not to forget the fact that there are implanted in the constitution of his nervous centres the capabilities of certain definite associated movements answering to certain sensations.

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* In regard to this question, an experiment by Volkmann, quoted by Fick, is interesting and instructive. When the finger, or any limited portion of skin on one side of the body, is frequently experimented upon with the compasses, in order to test the degree of sensibility, and its tactile sensibility thereby increased, as it notably is, above the level of that of neighbouring parts, the symmetrical part of the skin on the opposite side of the body will be found to be almost as acute,—an experimental proof of the same kind as that which the stereoscope furnishes.

The idea to be formed and fixed in the mind from a consideration of the phenomena of the development of sensation, and necessary to its proper interpretation, as indeed to the interpretation of every manifestation of life, is the idea of organization. The mind is not like a sheet of white paper which receives just what is written upon it, nor like a mirror which simply reflects more or less faithfully every object, but it implies a plastic power ministering to a complex process of organization, in which what is suitable to development is assimilated, what is unsuitable is rejected. By the appropriation of the like in impressions made upon the senses we acquire, as we might say, and as we do say when speaking of idea, a *general* or *abstract* sensation, which exists, latent or potential, as a faculty of the sensory centres, and on the occasion of the appropriate impression renders the sensation clear and definite. It is exactly like what happens in the spinal centres, and exactly like what happens, as we shall hereafter see, in the ideational centres. Coincidently with the assimilation of the like in impressions, there is necessarily a rejection of the unlike, which, being then appropriated by other cells, becomes the foundation, or lays the basis, of the faculty of another sensation, just as nutrient material which is not taken up by one kind of tissue element is assimilated by another kind. In the education of the senses, then, there takes place a differentiation of cells, in other words, a *discernment*, as well as an improvement of the faculty of each kind of sensation by the blending of similar residua. There is an analysis separating the unlike, a synthesis blending the like; and by the two processes of differentiation and integration are our sensations gradually developed. The process illustrates the increasing speciality of individual adaptation to external nature; and the length of childhood in man is in relation to the formation of his complex sensations.

The organization of our sensations is not, however, limited simply to the formation of the particular sensation; it effects also the association or catenation of sensations. In animals there can be no doubt that one sensation frequently calls another into activity, in accordance with the order established among them, without the intervention of idea; they are much more dependent on sensation than man is, and therefore the association of sensations in the causation of movements is more marked. Hence it is that blinding of one eye produces vertiginous movements in pigeons, as Flourens and Longet have shown, and that section of the semicircular canals of the ear also produces various disturbances of movements. In man it is certainly difficult to eliminate the influence of the higher cerebral centres, yet in those functions in which consensual action has most part—in the taking of food, for example, where succeeding sensations bring into successive action different complex muscular movements, and again in sexual copulation—there is abundant evidence of an association of sensations.

Thus much concerning sensation, viewed on its passive or receptive side. Let us say something more of the active, reacting, or distributive side—of the movements which take place in answer to sensations. These reactions may, like the reflex movements of the spinal cord, be irregular, as when a wry face is produced by a sour taste, or a general start of the body follows a sudden loud noise; or co-ordinate, as in coughing and sneezing. Of the co-ordinate or designed movements, again, some are innate, as those of the animals mostly are; others are acquired or secondarily automatic, as is mostly the case in man.

The innate sensori-motor actions of animals include, as before said, their instinctive acts. These have for aim the preservation of the individual and the propagation of the species; and are comparable to such movements in man as the closure of the eyelid when the conjunctiva is touched or the eye threatened, the withdrawal of the hand when suddenly burnt, the sneezing by which an offending body is ejected from the air passages, or some of the movements in sexual copulation. The faculty of executing them exists in the pre-arranged constitution of the nervous centres, and is entirely independent of will or experience; so that if we chose to assume a consciousness in the individual cells ministering to them we should say that they possessed a *notion* of the end to be effected. The cells probably possess such notion exactly in the same manner as the elements of a chemical compound possess a notion of the end which they are going to accomplish, or as the wind bloweth where it listeth;* accordingly they do not fail at times to make terrible mistakes, and perhaps miserably to kill an individual by continuing violently a reflex action, in the cessation of which lay the only hope of life. When the cerebral hemispheres are experimentally removed in animals, as was done by Flourens and Schiff, the sensori-motor acts abide: the animal appears as if in a sleep or dream, and takes no notice; yet if a pigeon so treated be thrown into the air, it flies; if laid on its back, it gets up; the pupil contracts to light, and in a very bright light the eyes are shut; it will dress its feathers if they are ruffled, and will sometimes follow by a movement of the head the movement of a candle hither and thither: certain impressions are plainly received, but they are not further fashioned into ideas, because the nervous centres of ideas have been removed; and, as has been aptly observed, the animal would die of hunger before a plateful of food, although it would swallow the food if put into its mouth. The clenching of the teeth in man during severe pain is sensori-motor, and only a less degree of the same kind of reflex action which in lockjaw becomes actual spasm. Schroeder van der Kolk mentions a lady who had her breast amputated under chloroform, and who, though she felt no pain, was perfectly conscious on awakening that she had heard herself shriek; and he has witnessed violent shrieking in apoplexy, where there was no trace of consciousness. Any one who has walked through a parrot house, and heard the fearful noise which these screaming creatures make, must have surely felt an involuntary inclination to shriek also.

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* "Whoever will examine the language of mankind may find that we apply expressions of bodies which belong properly to our own manner of proceeding; and how well soever we know the contrary, speak of them as voluntary agents, exercising powers of their own; thus it is said that the wind bloweth where it listeth, and we say of water, that it will not mingle with oil, that it will force its way, &c.: terms expressive of a choice, compliance, and resolution similar to those exercised by man."—Tucker's *Light of Nature*, vol. ii. p. 545.

It must be borne in mind that the sensori-motor reaction may be excited not only by the stimulus from without, but also, by, so to speak, sensation from within the body—by the organic stimuli. It is not because we have no direct consciousness of the operation of these stimuli that they do not therefore influence the mental life. In animals, the actions respondent to them constitute the principal manifestations of their psychical life; and in man, when the influence of the higher nervous centres is weakened by disease, or when an organic stimulus has an abnormal activity, as happens often in insanity, we sometimes see the instinct for food or the sexual instinct manifested with an utter shamelessness. In such cases there is great truth in an observation made by Jacobi, that the actions of the insane have an instinct-like character, as their physiognomies take on an animal-like look. The great revolution effected in the mental nature of man at the time when the organs of reproduction come into functional activity, affords a striking illustration of a physiological effect which in less degree is common to all the organic stimuli. And no account of the sensori-motor actions can be complete which fails to give due appreciation to the influence of a stimulus arising within the organism as an exciting cause of certain associated or aim-working movements.

Of more importance than the *innate* sensori-motor acts in human development are those which are *acquired*, and which are often called the secondary automatic acts. When any one moves about in a house or a room with the objects in which he is quite familiar, he is scarce more conscious of the greater part of his movements or of the objects around than he is of the movements of his breathing or of his particular steps in walking; notwithstanding which he does not run against the chairs nor stumble at the stairs, but fairly adapts his movements to the positions of objects. But if some new piece of furniture be placed in a part of the room where there was nothing before, the chances are that he does stumble against it, until, by familiarity or habit, the sensation of its presence has been associated with a corresponding movement. It will sometimes happen that, when the mind has been deeply occupied, a person has walked from one place to another through busy streets and yet been unable, when coming afterwards to think, to say positively which way he took. In dancing, in playing some musical instrument, in writing, in that grace and ease of movement acquired by social cultivation, we have other excellent examples of acquired consensual acts. A more striking instance, perhaps, than any of these is the association which is established by education between particular sounds or particular visual sensations, and the adapted complex movements for the articulation of the appropriate words. Children plainly exhibit a great tendency to imitate a particular sound, when there is certainly not yet any idea of what the sound means; and, as every one knows, it is sufficiently easy to read aloud without the slightest attention to the meaning of what is read, the consciousness being otherwise engaged. Dr. Radcliffe tells of a child which could speak both in English and German, but which always replied to a question in the language in which it was addressed, and could not reply to an English question in German, or to a German question in English. Without doubt the child connected definite ideas with the words used; but the fact that it could not put the same ideas into one language or the other, as required, showed the dominion exercised by the sound over the articulating movements—the mechanical connexion established between sensation and movement. Language, difficult as it is of acquisition, ultimately gets all the ease of a reflex act, and so many waste floods of fruitless words are poured forth without fatigue by some who, like Peter proposing to build the three tabernacles, wist not what they say. Consciousness is not a necessary accompaniment; talking may be conscious, semi-conscious, or entirely unconscious. Secondary automatic acts of a like kind are also observably acquired by animals, although in them the consensual acts are mostly innate; particular habits or tricks being observably taught to them or acquired by them.

How many of the common actions of man's everyday life fall under this category, few people sufficiently appreciate.

It is of the utmost importance to a true conception of the nature of mental action that the full meaning and real bearing of the foregoing facts should be distinctly realized. From a physiological point of view they are readily enough admitted; but the moment sensation is viewed as a mental faculty, an entirely new order of ideas commonly supervenes, and it appears to be thought monstrous to suppose that the full sensation is not innate, but gradually matured through years of experience. Then, again, it is almost impossible to make those who take the metaphysical view of mental action, realize the organic connexion which is established between the stimulus, or the sensation, and certain movements, whereby these finally become mechanical or automatic: when any end is accomplished, they fail not instantly to assign consciousness, and to assume design. It is not necessary to repeat here what was said of design, when treating of the spinal cord: the act, with whatever of design it contains, is the necessary result of a certain constitution, innate or acquired, of the nervous centres. In the humbler animals the life-aims are merely organic; the sensory ganglia suffice, therefore, as nervous apparatus; and the faculties of them, being primordial, are comparatively few, fixed, and simple. In man, however, whose relations are so much more numerous and special, whose life-aims reach far beyond the mere organic, there is not only a further complication of the nervous system as an original fact, but there is an acquired adaptation throughout life of the sensory ganglia to the complex external relations, so that their functional manifestations are more numerous, special, and complex. But in the latter case, as in the former, the action is ultimately automatic, and then as effectually accomplished without consciousness as with it. Until the psychologists ground their conceptions on these simple truths, they must continue to struggle fruitlessly in the maze of undefined words.

The reaction of the motor ganglia in the sensorium commune, whether designed or undesigned, co-ordinate or irregular, may be excited not only by impressions conveyed to them by afferent nerves, and by the so-called organic stimuli, but also by a stimulus descending from above. An idea or an impulse of the will, coming from the higher nervous centres, may act upon the ganglionic secondary centres, and call forth those movements which are commonly reflex to impressions from without. In such case it is tolerably certain that the idea or volitional impulse does not act directly on the motor nerve fibres, but indirectly through the ganglionic cells of the motor nuclei, in which the potentiality of the movement exists latent, statical, or, as it were, *abstract;* the stimulus from above disturbing the organic equilibrium, and, as it were, releasing or setting free the movement together with whatsoever of design there is in it, just as the impression conveyed by the afferent nerve from without does. Thus the will is entirely dependent for its outward realisation upon that mechanism of automatic action which is gradually organised in the subordinate centres; the will cannot, as we shall hereafter see, at once execute successfully a new movement, nor can it execute any movement without a guiding sensation of some kind: the cultivation of the senses, and the gradually effected special adaptation of their reactions, are necessary antecedents, essential pre-requisites, to the due formation and operation of will. The sensorium commune represents, in fact, various independent nervous centres, and never does act merely as a conductor transmitting unmodified the stimulus, whether this ascend from without, or descend from the cerebral hemispheres. Bear this clearly in mind, and the memory of it will help to get rid of some difficulties, when we come to deal with the will.

It is not needful to say anything here of the seeming disproportionate amount of force given out in the movement which is respondent to a moderate stimulus to the sensory ganglia; inasmuch as what was said in this regard of the spinal centres is strictly applicable to the secondary nervous centres. A special investigation would only serve here, as elsewhere, to adduce needless evidence in support of the principle of the conservation of force.

And now let us briefly indicate the general causes of disorder of the functions of the sensory ganglia: they are mainly such as have been already pointed out as causes of disturbance of the functions of the spinal cord:—

1. As a natural fact, there may be an innate vice, feebleness,

or instability of composition of the ganglionic cells. Such fault of nature is commonly owing to the existence of some nervous disease in the hereditary antecedents; but it may of course be due to any other of the many recondite causes of degeneration of nervous element. Hallucinations of vision are by no means unfrequent amongst some children at an early age, especially among such as suffer from chorea. And in those rare cases in which insanity occurs in children almost from the time of their nativity, it is chiefly exhibited in violent and irregular sensori-motor movements; herein there is a resemblance to the insanity that sometimes ensues in animals. The unnatural laughter, the shrieking, the biting, and the tearing, of the insane infant, assuredly testify to a degenerate state of the motor and sensory cells in the sensorium commune: one might even venture to say that there was a true *sensorial madness.* It is most interesting to add that the disorder may alternate with, or be replaced by, general convulsions, the madness ceasing when the convulsions supervene, and supervening when the convulsions cease; there is a transference of the disturbance from one system of nervous centres to another.

Again, there may be every degree of deficient sensibility down to actual insensibility of the ganglionic cells of the sensory ganglia. It is obvious that people differ naturally in the acuteness of their senses; and in idiots the senses notably partake of the general stupidity. In them the hearing is frequently defective; smell is often imperfect, the olfactory bulbs being insufficiently developed; taste absent or extremely vitiated, so that they will eat unconcerned the filthiest or the most pungent matters; and the sensibility of the skin is sometimes extensively absent, or it is generally dull, so that they suffer very little pain from injuries. The idiots of the lowest class have usually no other affection but that of hunger, which they exhibit by unrest, grunting, or the like; but even some of these miserable creatures have at times attacks of fury, without evident reason, in which they scratch, strike and bite, as the insane infant does.

Dulness of sensibility, when not nearly reaching the stage of idiotic degeneration, is of course unfavourable to intellectual acquisition; but, on the other hand, a very acute and delicate sensibility is attended with evils and dangers of its own. In the former case, although there is an impediment to assimilation, yet that which is appropriated is commonly retained with great persistency; in the latter case, there is certainly quick reaction, but no lasting appropriation, and, if the sensibility is intensified beyond a certain point, there may even be a lapse into that degenerate state in which, not the special sensation, but pain is felt, and irregular and convulsive reaction takes place. It is of no small importance that these natural differences in the constitution of the ganglionic cells should be plainly recognized, for they unquestionably are at the root of certain differences in character and intellect.

2. An excessive use of the senses, without due intervals of rest, produces exhaustion, or actual degeneration of them; here, as elsewhere, the force expended must be restored, if the energy of the matter is to be maintained. A too powerful impression made upon any sense may also diminish, or actually destroy, its power of reaction; immediate paralysis of sight, of hearing, or of smell has followed a sudden and powerful impression upon the particular sense; and if the paralysis is not complete, the sensibility of the sense for weaker impressions may still be lowered for some time. Moreover, the sensation itself may persist for a while after the cause of it has disappeared, as when an image of the sun remains after we have ceased to look at it, or the roar of the cannon abides in the ears after the firing has ceased. Such persistence of action in the ganglionic cell will serve to convey a notion of the condition of things when there is hallucination otherwise caused.

3. The state of the blood has the most direct effect upon the functions of the sensory ganglia. Too much blood, as is well known, gives rise to subjective sensations, such as flashes of light before the eyes, and roaring in the ears; but it is not so generally known that, when the abnormal action reaches a certain intensity, movements responsive to, or sympathetic with, the hallucinations may take place. Nevertheless, they may: as the sensory ganglia have an independent action in health, so also may they act independently in disease; and as in health there is co-ordinate or designed sensori-motor action, so in disease may there be convulsive sensori-motor action evincing more or less co-ordination or design. Of violent, but more or less co-ordinate, action

we have, I think, a good example in the raving and dangerous fury which often follows a succession of severe epileptic fits, and which I take leave to describe as in great part a true *sensorial insanity.* The patient's senses are possessed with hallucinations, their ganglionic central cells in a state of convulsive action; before the eyes are blood-red flames of fire, amidst which whosoever happens to present himself, appears as a devil, or otherwise horribly transformed; the ears are filled with a terrible roaring noise, or resound with a voice imperatively commanding him to save himself; the smell is perhaps one of sulphurous stifling and the desperate and violent actions are, like the furious acts of the elephant, the convulsive re-actions to such fearful hallucinations. The individual in such state is a machine set in destructive motion, and he perpetrates the extremest violence or the most desperate murder without consciousness at the time, and without memory of it afterwards. When we come to the general pathology of insanity, we shall have more to say upon this matter.

A deficiency of healthy blood is a cause of disorder of the sensory centres. A great loss of blood powerfully affects the senses; the anæmia of chlorotic and hysterical women is the probable cause of the many anomalous sensations and motor disturbances, which disappear as the condition of the blood improves; and a manifest poverty of blood often accompanies the chorea of children with its hallucinations.

A perverted condition of the blood, whether from something bred in the body or introduced from without, is recognised as a powerful cause of sensory disorder. Evidence of such injurious influence we have in the hallucinations which sometimes follow for a time certain acute diseases, as well in the delirium which occurs in the course of them; in the effects which alcohol produces upon the senses; in the actions of poisons, such as belladonna and aconite, which markedly affect the senses; and especially in the operation of haschisch, a poison which appears to concentrate its action upon the sensorium commune. In hydrophobia the presence of a virus in the blood notably gives rise to most violent nervous disturbance; the sight or sound of a fluid, a movement in the room, or a current of air, being sufficient to excite terrible convulsions.

4. An irritation operating by reflex action is undoubtedly the occasional cause of sensorial disturbance. Pressure upon or wound of a sensitive nerve has sometimes produced extensive paralysis of sensibility; a bad tooth may notably give rise to amaurosis; vertigo, hallucinations, and illusions are now and then plainly the result of an irritation proceeding from a centripetal nerve, not perhaps felt in any other way than as it is testified by effects which disappear with the removal of the irritation. An interesting example of severe disturbance of the nervous centres from a slight eccentric irritation, is related by Dr. Brown-Séquard, to whom it was communicated by Mr. C. De Morgan. A lad, aged fourteen, as he was getting up in the morning, was heard by his father to be making a great noise in his bedroom. On the latter rushing into the room, he found his son in his shirt, violently agitated, talking incoherently, and breaking to pieces the furniture. His father caught hold of him and put him back into bed, where at once the boy became composed, but did not seem at all conscious of what he had done. On getting out of bed he had *felt something odd,* he said, but he was quite well. A surgeon, who was sent for, found him still reading quietly, with clean tongue and cheerful countenance, and wishful to get up. He had never had epilepsy, but had enjoyed good health hitherto. He was told to get up; but on putting his feet on the floor, and standing up, his countenance instantly changed, the jaw became violently convulsed, and he was about to rush forward, when he was seized, and pushed back on to the bed. At once he became calm again, said he had *felt odd,* but was surprised when asked what was the matter with him. He had been fishing on the previous day, and having got his line entangled, had waded into the river to disengage it, but was not aware that he had hurt his feet in any way,—that he had even scratched them. "But on holding up the right great toe with my finger and thumb, to examine the sole of the foot, the leg was drawn up, and the muscles of the jaw were suddenly convulsed, and on letting go the toe these effects instantly ceased." There was no redness, no swelling, but on the bulb of the toe a small elevation, as if a bit of gravel, less than the head of a pin, had been pressed beneath the cuticle. On compressing this against the nail cautiously, a slight convulsion ensued; there

was no pricking when pressed, but he said *something made him feel very odd.* The slightly raised part was clipped away; no gravel was found, but the strange sensation was gone, and never returned.*

The general bodily feeling which results from the sum of the different organic processes is not attended with any definite consciousness, or idea, of the causes that give rise to it; the organic stimuli are, in fact, organically felt, but do not in the natural state of health excite, as a stimulus to one of the special senses does, a particular state of consciousness; and when the organic stimuli do force themselves into consciousness, as happens in disease, then it is in pain that their action is felt. In respect of our organic feeling we are, in reality, not unlike those humble animals that have a general sensibility without any organs for special discrimination and comparison. Having no idea of the particular cause of any modification in this general feeling, we are plainly most favourably placed for the generation of illusions with regard to the cause. Consequently it is not surprising to find that the insane frequently have extravagant hallucinations and illusions respecting the cause of an abnormal sensation, which is actually due to a morbid state of some internal organ; they think to interpret it as its unusual character seems to demand, and in accordance with their experience of the definite perceptions of the special senses; and accordingly they attribute the anomalous feeling to frogs, serpents, or other such creatures that have got into their insides.

5. Whether any beneficial influence is exerted upon the nutrition of the nervous centres of the sensorium commune by the centres that lie above it, must remain uncertain. No trustworthy conclusions can be drawn from experiments in which the cerebral hemispheres have been removed, for the mischief done is far too great to warrant any inference. It is certain that a centre of morbid activity in the cerebral hemispheres may act injuriously upon the sensory centres, and give rise to secondary derangement of their functions; but the result is then most likely due to reflex or sympathetic action, the morbid centre

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* Lectures on the Physiology and Pathology of the Central Nervous System, by Dr. Brown-Séquard, 1860.

acting as the morbid centre in another internal organ notably does.

In concluding this account of the sensory nervous centres, we have only to add that a review of their relations and functions does certainly establish a close analogy with the relations and functions of the spinal centres. In both cases there are nervous centres which have the power of independent reaction, though they are usually subordinated to the action of higher centres; in both cases the faculties are for the most part organized in relation to outward circumstances through the plastic power of the nervous centres; and, in both cases, the independent power of action of the centres may, by reason of disease, be exhibited in violent demonstration. The convulsive paroxysm which seizes on the cells of the sensorium commune, and drives the furious epileptic on to desperate violence, is as little within his control as is the convulsion of his limbs that is owing to disease of the spinal cord.

NOTES.

[1] (*p.* 89).—It ought not to be forgotten that Dr. Darwin distinguished voluntary from sensori-motor movements. "Many common actions of life are produced in a similar manner (*i.e.* by sensation). If a fly settle on my forehead, whilst I am intent on my present occupation, I dislodge it with my finger without exciting my attention or breaking the train of my ideas."—*Zoonomia*, vol. i. p. 40. "Other muscular motions, that are most frequently connected with our sensations, as those of the sphincter of the bladder and anus, and the musculi erectores penis, were originally excited into motion by irritation, for young children make water, and have other evacuations, without attention to these circumstances—'et primis etiam ab incunabulis tenduntur sæpius puerorum penes, amore nondum expergefacto.' So the nipples of young women are liable to become turgid by irritation, long before they are in a situation to be excited by the pleasure of giving milk to the lips of a child."—*Ibid.*, p. 38. "There is a criterion by which we may distinguish our voluntary acts or thoughts from those that are excited by our sensations. The former are always employed about the *means* to acquire pleasurable objects, or to avoid painful ones; while the latter are employed about the *possession* of those that are already in our power." And he goes on to say that the

ideas and actions of brutes, like those of children, are almost perpetually produced by their present pleasure or their present pains; they seldom busy themselves about the means of procuring future bliss or avoiding future misery.—*Ibid.*, vol. i. p. 184.

[2] (*p.* 91).—Alciphron :—

"If vision be only a language speaking to the eyes, it may be asked, when did men learn this language? To acquire the knowledge of so many signs as go to the making up a language, is a work of some difficulty. But will any one say he hath spent time, or been at pains, to learn this language?"

Euphranor :—

"No wonder we cannot assign a time beyond our remotest memory. If we have been all practising this language ever since our first entrance into the world—if the author of nature constantly speaks to the eyes of all mankind, even in their earliest infancy, whenever their eyes are open in the light, whether alone or in company, it doth not seem to be at all strange that men should not be aware that they had ever learned a language begun so early, and practised so constantly as this of vision. And if we also consider that it is the same throughout the whole world, and not like other languages, differing in different places, it will not seem unaccountable that man should mistake the connexion between the proper objects of sight and the things signified by them to be founded in necessary relation, or likeness, or that they should even take them for the same things. Hence it seems easy to conceive why men, who do not think, should confound in this language of vision the signs with the things signified, otherwise than they are wont to do in the various particular languages formed by the several nations of men."—Bishop Berkeley's *Minute Philosopher*, vol. i. p. 393.

CHAPTER V.

HEMISPHERICAL GANGLIA; CORTICAL CELLS OF THE CEREBRAL HEMISPHERES; IDEATIONAL NERVOUS CENTRES; PRIMARY NERVOUS CENTRES; INTELLECTORIUM COMMUNE.*

THAT the nerve-cells which exist in countless numbers in the grey cortical layers of the hemispheres, are the nervous centres of ideas, is fully admitted by all those who have most studied the physiology of the brain, and are best entitled to speak on the matter. The cerebral hemispheres represent, in reality, two large ganglia that lie above the sensory centres, and are superadded in man and the higher animals for the further fashioning of impressions, or of sensory perceptions, into ideas or conceptions, for that *recreation* of nature by abstraction of the essential from the particular, and its re-embodiment in idea—that epigenetic development of nature, if I might so speak—in which the evolution of the human mind really consists. Looking not at the individual man and his work as the end, but looking at him as a small and subordinate part of the vast and harmonious whole, as a means to a far-off end, it is sufficiently evident that the history of mankind is the history of the latest organic development of nature—that in the evolution of the human mind nature is undergoing its consummate development through man. And the law manifest in this highest display of organic development, is still that law of progressive specialization and increasing complexity which has been traceable through the long chain of organic beings. So exquisitely delicate, however, are the organic processes of mental development which take place in the minute cells of the cortical layers, that they are certainly, so far as our present means of investigation reach, quite impenetrable to the senses; they are like nebulæ which no telescope can yet resolve.

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* "We have not a name for that complex notion which embraces, as one whole, all the different phenomena to which the term 'Idea' relates. As we say 'Sensation,' we might also say, 'Ideation;' it would be a very useful word; and there is no objection to it, except the pedantic habit of decrying a new term." —James Mill, *Analysis of the Human Mind*, p. 42.

The anatomists believe that they have now demonstrated that the nerve fibres which ascend from the spinal cord through the medulla oblongata do not pass directly to the surface of the hemispheres, but end in the ganglionic cells of the corpora striata; new fibres starting from these cells, and radiating to the cortical cells, to establish the communication between the primary and secondary nervous centres. There is, then, a sufficient anatomical reason for an inference previously made on other grounds, which is, that an idea, or an impulse of the will, cannot act directly upon the motor nerve fibres of the body, but only through the medium of the proper subordinate centres. It is extremely probable, again, that different convolutions of the brain do subserve different functions in our mental life; but the precise mapping out of the cerebral surface, and the classification of the mental faculties, which the phrenologists have rashly made, will not bear scientific examination. That the broad and prominent forehead indicates great intellectual power was believed in Greece, and is commonly accepted as true now; the examination of the brains of animals and idiots, and the comparison of the brain of the lowest savage with the brain of the civilized European, certainly tend to strengthen the belief. Narrow and pointed hemispheres assuredly do mark an approach to the character of the monkey's brain. There is some reason to believe also, that the upper part of the brain and the posterior lobes have more to do with feeling than with the understanding. Huschke has found these parts to be proportionately more developed in women than in men; and Schroeder van der Kolk thought that his pathological researches had afforded him the most convincing proofs that the anterior lobes of the brain were the seat of the higher intellectual faculties, while the upper and posterior lobes ministered rather to the emotional life. Recently some observations have been made with the view of establishing a theory, that a portion of the anterior lobe, the third frontal convolution of the left hemisphere, was the seat of language; but the observations reported are unsatisfactory, directly contradictory observations are overlooked, and it is contrary to the first principles of psychology to suppose that language, complex and organic as it is in its intellectual character as the sign or symbol of the idea, can have so limited and defined a seat in the brain. On the whole, it must be confessed that, so far, we have not any certain and definite knowledge of the functions of the different parts of the cerebral convolutions. The anatomists cannot even agree on any convolution as peculiar to man; all that they can surely say is, that his convolutions are more complex and less symmetrical than those of the monkey. "If man was made in the image of God, he was also made in the image of an ape."*

The cortical cells of the hemispheres, like the ganglionic cells of the sensory centres and of the spinal cord, may certainly act as nervous centres of independent reaction. Without any volition, or even in direct defiance of volitional effort, an idea which has become active may pass outwards, and produce movement, or some other effect upon the body. The suddenly excited idea of the ludicrous, for example, causes involuntary laughter; the idea of an insult, a quick movement of retaliation; the idea of a beautiful woman, a glow of amatorial passion; the idea of a great impending danger, or of a sudden terrible affliction, serious or even fatal disturbance of the organic life; the idea of an object, sometimes an actual hallucination. Most of the earlier actions of children are prompted by ideas and feelings that are excited by suggestions from without, and immediately react outwards. In the phenomena of electro-biology or hypnotism, the mind of the patient is possessed with the ideas which the operator suggests, and his body becomes an automatic machine, set in motion by them. Every one's experience will recall to him occasions on which an idea excited in his mind could not be dismissed therefrom by the will, and perhaps would not let him rest until he had realized it in action, even though such realisation appeared to his judgment inadvisable. Those who have attended carefully to the course of their own thoughts, and reflected upon their actions, will readily acknowledge that an idea sometimes arises and produces a movement without there having been any active consciousness of it, the effect being that which first arouses consciousness, if it is aroused at all. How many of the daily actions of life, thus accomplished, are we never conscious of unless we set ourselves deliberately to reflect. It is most certain that there may be a reaction outwards of an ideational nerve cell, independently of volition, and even without consciousness.

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* Hallam, *Introduction to History of Europe.*

As it was with the faculties of the spinal and sensory centres, so is it with the faculties of the ideational centres: they are not innate. The notion of *innate* idea, in the exact meaning of the word, as connatural or contemporary with birth, is not less untenable and absurd than an innate pregnancy. (1) But if by innate is only meant that, by the necessity of his nature, a well-constituted individual placed in certain circumstances will acquire certain ideas, then all the phenomena of a man's life, bodily or mental, are just as innate or natural. It is necessary here to distinguish between what is *predetermined* by the nature of things, and what is *preformed*. The formation of an idea is an organic evolution in the appropriate nervous centres, a development which is gradually completed in consequence of successive experiences of a like kind. The impressions of the different properties or qualities of an object received through the different senses, are combined in the compound idea of it which is gradually matured in the mind, and henceforth we can make assertions concerning it as a unity, when it is not present to sense. The cells of the cerebral ganglia do, in reality, *idealize* the sensory perceptions; grasping that which is essential in them, and suppressing or rejecting the unessential, they mould them by their plastic faculty into organic unity of an *idea*, in accordance with fundamental laws. Every idea is thus an *intuition*, and implicitly comprises far more than could be explicitly displayed in it. Herein the process of ideation only follows the law of organic development as manifest everywhere, and as previously illustrated in the development of nervous element itself. Whosoever, biassed by the metaphysical conception of mind, finds it difficult to realize this process of the organic growth of idea, let him reflect upon the manner of organic growth which confessedly takes place in the language in which our ideas get embodiment. As language is not innate, but a slow development through the ages, in conformity with the development of thought, we may make use of the science of what is seen, as evidence of processes that at present are unseen, and use the study of language as an instrument of the analysis of ideas.

Those who are metaphysically minded have done with idea as they have done with sensation: they have converted a general term summing up a great number of varied phenomena into an actual entity, and thenceforth allowed it to tyrannize over the thoughts. It is a great and mischievous error to suppose that an idea of the same object or event has always a uniform quantitative and qualitative value; and the way in which it is the custom to speak of certain abstract ideas, as if they were constant entities admitting of no variation, nor of the shadow of a change, is a remarkable example of that self-deception by which man fondly fools himself "with many words making nothing understood." An idea may be definite, clear, and adequate, or it may be indefinite, obscure and inadequate; and it by no means follows, therefore, that because the same name is given to an idea in two people, it has the same value in each. Certain ideas will always have a different value in persons at a different stage of cultivation; and when the well-meaning traveller, or the ardent missionary thinks to find in the miserable savage the idea of a god, he should take heed that he is not erroneously interpreting the savage mind by the text of his own. The ideas of virtue and vice, for which the Australian savage confessedly has no words in his language, cannot be implanted or organized in his mind, until, by cultivation continued through generations, he has been humanized and civilized. (²)

To acquire those so-called fundamental ideas, universal intuitions, or categories of the understanding, of which some metaphysicians make so much, as constant elements, though they differ greatly in value in different people, there is no other need but, using Hobbes' words, "to be born a man, and live with the use of his five senses." (³) Because all men have a common nature, and because the nature by which all men are surrounded is the same, there are developed certain ideas which have a universal application, but they are nowise independent of experience; on the contrary, the universality of their character is owing to the very fact that in every experience they are implicitly suggested or prompted, so that they finally become fixed as endowments in the acquired nature or organization of the nervous centres; conscious acquisition becoming here, as elsewhere, unconscious faculty, by virtue of an organic process. But their absolute truth, as expressions of certain fundamental relations between man and nature, is only guaranteed by the assumption of an unchanging persistence of these relations; a new sense conferred upon him would entirely change the aspect of things, and render necessary a new order of fundamental ideas.* (^{4})

Having said thus much concerning the manner in which our ideas are acquired, I proceed to indicate the different ways in which the reaction of an idea, when active, may be displayed: having considered idea as statical, it now remains to consider it in actual energy.

a. The reflex action or reaction of an ideational nerve-cell may be downwards upon the motor centres, and may thus give rise to what has been called *ideomotor* movements.† The energy may be exerted either upon the involuntary or upon the voluntary muscles; and in the latter case, it takes place either with consciousness or without consciousness. The idea that the bowels will act may notably sometimes so affect their involuntary peristaltic movements as to produce evacuation of them; the idea that vomiting must take place, when a qualmish feeling exists, will certainly hasten vomiting; the idea of a nervous man that he cannot effect sexual intercourse assuredly may incapacitate him from copulation; and there is a very remarkable instance told in the Philosophical Transactions of a man who could for a time stop the motions of his heart.* These are examples of the influence of idea upon the involuntary muscles, and they are conformable to what has been previously said of the subordination of the quaternary or organic nervous centres to the cerebro-spinal system. Some people even are able, through a vivid idea of shuddering, or of something creeping over their skin, to produce a *cutis anserina*, or goose's skin: the immediate effect of the idea in this case, however, is probably to excite the appropriate sensation which thereupon gives rise to the sequent phenomena. Examples of the action of idea upon our voluntary muscles are witnessed in every hour of our waking life. Very few, in fact, of the familiar acts of a day do call the will into action: when not sensori-motor they are mostly prompted by an idea. But the point on which I would lay stress here is, that such ideomotor movements may take place, not only without any intervention of the will, but also without consciousness: they are automatically accomplished, like the actions of the sleep-walker, in obedience to an idea or series of ideas, of which there is no active consciousness. It may seem paradoxical to assert, not merely that ideas may exist in the mind without any consciousness of them—which every one admits in their dormant, latent, or statical condition they may—but that an idea, or a train of associated ideas, may be quickened into action, and excite movements, without themselves being attended to. But it is unquestionably so: a great part of the chain of our waking thoughts, and of the series of our daily actions, actually never is attended to: at first consciously acquired, these have now become automatic. Persons who have a habit of talking to themselves are generally unaware that they are talking, and yet they are performing both associate ideas and associate movements.

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* "We can conceive ourselves as endowed with smelling and not enjoying any other faculty. In that case, we should have no idea of objects as seeable, as hearable, as touchable, or tasteable. We should have a train of smells; the smell at one time of the rose, at another of the violet, at another of carrion, and so on. Our life would be a train of smells."—J. Mill, *Analysis of the Human Mind.*

† "To prove that Ideas, as well as Sensations, are the cause of muscular actions, it is necessary to make choice of cases in which the Idea is in no danger of being confounded with that state of mind called the Will. And hardly any case will answer this condition, except some of those which are held to be involuntary, for the Idea itself never can be very clearly distinguished from the Will."—J. Mill, *op. cit.* p. 265. He instances yawning on seeing some one yawn, the infectious power of convulsions, laughter, sobbing, the swallowing of saliva, if assured that you cannot. "It seems, therefore, to be established by a simple induction, that muscular actions follow ideas, as invariable, antecedent and consequent, in other words, as cause and effect; that, whenever we have obtained a command over the ideas, we have also obtained a command over the motions; and that we cannot perform associate contractions of several muscles, till we have established, by repetition, the ready association of the ideas."—*Ibid.* p. 274.

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* "There is an instance told in the *Philosophical Transactions* of a man who could for a time stop the motions of his heart when he pleased; and Mr. D. has often told me he could so far increase the peristaltic motion of his bowels by voluntary efforts as to produce an evacuation by a stool at any time in half-an-hour."—*Zoonomia*, vol. i. p. 39.

It is surprising how uncomfortable any one may be made by the obscure notion of something which he ought to have said or done, but did not, and which he cannot for the life of him now remember. There is a dim feeling of some impulse unsatisfied, an effort, as it were, of the lost idea to get into consciousness—a certain activity of it not sufficient to excite consciousness, but sufficient to react upon the unconscious mental life, and to produce a feeling of discomfort or vague unrest, which is relieved directly the idea bursts into consciousness. Then, again, when an active idea has once taken firm possession of consciousness, how hard a matter it is to dismiss it! Some weak-minded persons cannot do so until they have expended its force in suitable action: let a hysterical woman get a vivid idea of some action that she must do: the idea becomes a fate which she must sooner or later obey, not otherwise than as in electro-biology or hypnotism the patient is governed by the idea which the operator suggests. Let a quick-tempered man conceive a great insult suddenly done to him: in a moment, without any intervention of the will, the idea reacts upon the muscles of his body, and produces more or less general tension of them. Let a man engaged in a fight get the idea that he will be beaten: his muscular energy is weakened, and he is already half conquered.

(*b*) The reflex action of an ideational nerve-cell may operate not only downwards upon the muscular system, but also downwards upon the sensory ganglia. As the idea is excited into activity by the impression on the senses, so it may in turn react downwards upon the sensory centres, giving rise even under certain circumstances to illusions and hallucinations. The idea of a nauseous taste may excite the sensation to such a degree as to produce vomiting; the sight of a person about to run a sharp instrument over glass will set the teeth on edge; the images of dreams are sometimes, as Spinoza has remarked, really visible for a while after the eyes are open. The celebrated Baron von Swieten, says Dr. Darwin, who illustrates this kind of ideational action by many instances, "was present when the putrid carcase of a dead dog exploded with prodigious stench; and, some years afterwards, accidentally riding along the same road, he was thrown into the same sickness and vomiting by the idea of the stench, as he had before experienced from the perception of it."

The action of idea upon our sensory ganglia is a regular part of our mental life; for the co-operation of sensory activity is nothing less than necessary to clear conception and representation. In order to form a distinct and definite conception of what is not present to sense, we are compelled to form some sort of image of it in the mind; the sense of sight, which anatomically is in most extensive connection with the cerebral ganglia, affording us the greatest assistance in this regard. Men differ much in the power which they have of thus rendering an idea sensible. Goethe could call up an image at will, and make it undergo various transformations, as it were, before his eyes; Shelley appears to have been on one occasion, at least, the victim of positive hallucinations generated by his ideas. But the most remarkable instance of a habit of seeing his own ideas as actual images was afforded by the engraver, William Blake. "You have only to work up imagination to the state of vision, and the thing is done," was his own account of the genesis of his visions.* To render definite the creations of the imagination, and to give fit expressions to them, some sensible image of them must be represented to the mind. The great writers whose vivid descriptions of scenery or events hold our attention and stir our feelings, have this power in high degree; they create for themselves a world of sense by the influence of idea, and then strive to present vividly to us what they have thus represented to their own minds. Natural endowments being equal, those writers who have the greatest number of residua stored up in consequence of much and varied experience, are best qualified to call up vivid images, and best qualified to call up such as are truly representative of nature; whilst those who are wanting in experience, or who have not sufficiently cultivated observation, are apt to become visionary, vague, and unreal. Even in matters of scientific research, the scientific imagination by which hypotheses are successively framed until a fit one is obtained, its verification completed, and a discovery thus made, is based upon a previous careful training of the senses in scientific observation, and works by means of sensory representations. Natural endowments not being equal, however, we then perceive the wide difference there is between one who has an adequate idea and one who has not. The latter, in describing scenery or events, will give a tedious picture characterised by minute industry and overwrought detail, in which there is no due subordination of parts, no organic unity of idea—in which truly soul is wanting—and from which, therefore, no one can carry away a true idea of the whole : unpregnant of his subject, he has been going about to give a photographic copy or a minute delineation of what cannot be photographed. The former, on the other hand, produces, through the plastic power of idea, a picture in which the unessential is suppressed, the essential thoroughly grasped and moulded into an organic unity, in which due subordination and co-ordination of parts prevail, and from which, therefore, a true idea of the whole may be educed; truly comprehending or grasping his subject, he has in fact idealized the sensory perceptions, and has displayed a real development of nature. This sort of difference between men is not less evident in scientific working. One man records with a praiseworthy but tedious industry, the unconnected impressions made upon his senses, and never gets further than that: fondly thinking that he sees with his eye, and not through it, he would, were he set to describe the sun for the first time, describe it as a bright disc about the size of a big cheese, and rest content for the future with this sensory representation of it. The other and truer man of science succeeds in combining, by means of the organizing power of idea, the scattered impressions made upon the senses, is able by comparison to complement or correct the impression made on a particular sense, and to form to himself a true image of the sun, not as a mere disc of fire, but as an immense central body moving through space, with its attendant planetary system, at the rate of some 400,000 miles a day. Only those who are destitute of idea would dream of rejecting entirely the aid of idea in scientific inquiries.

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* "Dr. Ferriar mentions of himself that, when at the age of fourteen, if he had been viewing any interesting object in the course of the day, as a romantic ruin, a fine seat, or a review of troops, as soon as evening came the whole scene was brought before him with a brilliancy equal to what it possessed in daylight, and remained visible for some minutes."—Abercrombie, *On the Intellectual Powers.* Sir I. Newton could recall an ocular spectrum of the sun when he went into the dark and directed his mind intensely, "as when a man looks earnestly to see a thing which is difficult to be seen."

These observations will not be a useless digression if they serve to teach how essential to the completeness of conception is the functional action of the sensory ganglia, how much our intellectual development depends, not only upon the cultivation of careful habits of observation, but also upon the co-operation of the sensory centres in the subsequent intellectual action. The excitation and cultivation of the sensorial cells are necessary antecedents, in the order of mental development, to the activity of the ideational cell; and the ideational cell in turn effects its complete function in the formation of a distinct conception by reacting downwards upon the sensory centres. This secondary intervention of the sensory ganglia is not peculiar to man, being, perhaps, more evidently displayed in some of the lower animals. When the dog scents the rabbit, and begins to scratch furiously at the burrow, it is plain that the sense of smell has excited either directly the visual image of the rabbit, or rather, as the dreaming of the dog would seem to indicate, the idea of the rabbit, which idea thereupon excites the appropriate image. It is worthy of remark, how singularly effective in man the sense of smell is in recalling vividly the ideas and images of forgotten scenes and places. This reaction of ideas upon the senses is again very notable in dreams; and in insanity, when the relations of the nervous centres are disturbed, actual hallucinations of a sense, such as cannot be corrected by the evidence of unaffected senses, or by reflection, are sometimes due to the influence of ideas. This disordered action is, after all, only an exaggeration of a process which is natural in our mental life. The idea cannot receive its stimulus directly from the external world, nor can it react directly upon the external world; both in its origin and in its expression are the senses concerned.

(*c*) A third important, though little recognised, way in which idea may operate, is upon the functions of nutrition and secretion. Whether the idea acts, as is probable, directly upon the organic elements of the part through its nerves, or whether it acts indirectly by an effect upon the vaso-motor system, it is certain that the influence of an idea may increase a secretion or lessen it, and may modify nutrition. The idea of food will cause a flow of saliva; a sympathetic idea, a flow of tears; the idea of itching in a particular spot will give rise to an itching there; and the idea that a structural defect will certainly be removed by a particular act does sometimes so affect the organic action of the part as to produce a cure. The most successful physician is ever one who inspires his patient with the greatest confidence in the virtue of his remedies. Bacon rightly, therefore, would have us inquire into the best means to "fortify and exalt the imagination." "And here," he says, "comes in crookedly and dangerously a palliation and defence of a great part of ceremonial magic. For it may be speciously pretended that ceremonies, characters, charms, gesticulations, amulets, and the like, do not derive their power from any tacit or sacramental contract with evil spirits, but serve only to strengthen and exalt the imagination of him who uses them." *

(*d*) There is yet another path which the energy of an idea may take. As, in reflex action of the spinal cord, the residual force which was over and above what passed directly outwards in the reaction travelled upwards to the sensorium commune and excited sensation; and as in sensori-motor action the residual force which was over and above what passed outwards in the reaction travelled up to the cortical cells, and gave rise to idea; so, in ideational action, the force which does not pass, or the residual force which may be over and above what does pass, immediately outwards in the reaction, abides in action in the cortical centres, and passes therein from cell to cell. There is no superimposed collection of cells of a higher kind to which it might now ascend, and wherein it might excite a higher kind of mental activity; there is, instead, an infinite multitude of nerve-cells in the cortical layers, having most varied and numerous connexions, whereby activity may be communicated from one to another. This communication is what does take place, probably, when one idea calls up another by some association, itself disappearing in the act. It is probable that one idea can only call another into activity through its own disappearance, as one wave disappears in the production of another; this, which is Müller's simile, expressing the condition of things better perhaps than that of Hobbes, who looked upon one idea as obscured by the more active one, "in such manner as the light of the sun obscureth the light of the stars; which stars do no less exercise their virtue, by which they are visible, in the day than in the night." † (5) There is, as would appear, not only a transference, but a transformation of force from cell to cell within the hemispherical ganglia; and the tension of the particular cell, or the idea for the moment active, is attended with consciousness. We are now come, then, to another sphere of mental activity, namely, activity within consciousness, or reflection.

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* De Augmentis Scientiarum, B. iv.

† Dr. Brown (*Physiology of the Mind*, p. 223) held, however, that the slightest

It behoves us here to settle clearly in our minds the relation of consciousness to ideational activity, or at any rate to be on our guard against considering consciousness as co-extensive with such activity. When the whole energy of an idea that is excited passes immediately outwards in ideomotor action, then there is scarce any, or there may be no, consciousness of it; in order that there may be consciousness of the idea, it is necessary not only that its excitation reach a certain intensity, but that the whole force of it do not pass immediately outwards in the reaction. The persistence for a time of a certain degree of intensity of energy in the ideational cell would certainly appear to be the condition of consciousness. Accordingly when the process of reflection is going on, quietly and rapidly, through the regular association of ideas, there is no consciousness of the steps; in the train of thought one idea calls another into activity without being itself attended to, so that the result may appear as if sudden and accidental, and it may be very difficult, or quite impossible, to retrace the steps, or take up the successive links, by which it was evolved. In the course of a day how many thoughts or ideas do thus suddenly start into consciousness, or, as we may say, suddenly strike us! The activity of one ideational cell would seem to be communicated immediately to another, and the energy thus to run

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attention to the successive states of mind would show "that a conception, after giving rise to some new conception, does not always cease to be itself a part of our continued consciousness." He thought that it often remained so as to co-exist with the conception which itself had induced, and might afterwards suggest other conceptions, or other feelings, with which it might then co-exist in a still more complex group. "We compare, we choose, in our internal plans, because different objects are together present to our conceptions." Sir W. Hamilton limited to six the number of objects which might exist in consciousness at the same time; and Mr. J. S. Mill, in his *Examination of Sir W. Hamilton's Philosophy*, allows a "*great multitude of states, more or less conscious, which often co-exist in the mind!*" On this question Sir H. Holland has some excellent remarks in his "Chapters on Mental Physiology;" and for a fuller notice of it than would be proper here, I may refer to a review of Mr. J. S. Mill's criticism of Sir W. Hamilton in the *Journal of Mental Science* for January 1866.

through a series by a continuous transformation, with no residual persistence at any of the intermediate stages.

A conception of the way in which a group or series of movements are observably associated, and the faculty of them is firmly organized in the nervous centres, so that they are henceforth automatically performed, will be found most serviceable in the interpretation of the phenomena of ideational activity. Like muscular motions, ideas are associated in groups or series; like them, they become easier with repetition; like them, they are excited into action by an appropriate stimulus; like them, when once associated, they are not easily separated; like them, they may be accomplished without consciousness; like them, they demand an appreciable time for their accomplishment; and, like them, they are fatigued by prolonged exercise. The question of the time necessary for the performance, so to speak, of an idea is really a most important one, which has not hitherto received sufficient attention. It is sometimes not less than the time required for the performance of a muscular motion; for, as Dr. Darwin observed, a musician can press the keys of a harpsichord with his fingers in the order of a tune which he has been accustomed to play, in as little a time as he can run over those notes in his mind. Nay, an idea may even require more time than a movement: how many times in a day do we cover our eyes with our eyelids without ever perceiving that we are in the dark? In this case, as Dr. Darwin has also observed, the muscular motion of the eyelid is performed quicker than the idea of light can be changed for that of darkness: the twinkling of an eye being quicker than thought.(6) The interference of consciousness is often an actual impediment in the association of ideas, as it notably is to the performance of movements that have attained the complete ease of an automatic execution. It happens that we try hard to remember something, and are unable by the utmost effort of volition, and the strongest direction of consciousness, to do so: we thereupon give up the attempt, and direct our attention to something else; and, after a while, the result for which we strove in vain, flashes into consciousness: the automatic action of the brain has worked it out. That is exactly what we might expect to happen: for if consciousness implies a persistence of the tension of a nerve-cell's energy, then in proportion to the degree of persistent tension must be the retardation of, or hindrance to, the process of association of ideas, which is effected by a transformation of energy from one to another of the catenated cells. An active consciousness is always detrimental to the best and most successful thought: the thinker who is actively attentive to the succession of his ideas is thinking to little purpose; what the genuine thinker observes is that he is conscious of the words which he is uttering or writing, while the thought, unconsciously elaborated by the organic action of the brain, flows from unpenetrated depths into consciousness. *Reflection* is then, in reality, the reflex action of the cells in their relations in the cerebral ganglia: it is the reaction of one cell to a stimulus from a neighbouring cell, and the sequent transference of its energy to another cell—the reflection of it. *Attention* is the arrest of the transformation of energy for a moment—the maintenance of a particular *tension*. Bear in mind what was said of the varying value of an idea and of the manner of its gradual organization in the nervous centres, and the applicability of the term *deliberation* to a process of thought, as a weighing or balancing of one reason against another, will be evident. Or we if prefer the term *ratiocination*, we may say, with Hobbes, that by it is meant *computation*. "Now to compute is either to collect the sum of many things that are added together, or to know what remains when one thing is taken from another. *Ratiocination*, therefore, is the same with *addition* and *subtraction*." Subtract the energy of an opposing idea from a more powerful one, and the energy left represents the resultant force of impulse after deliberation; add the energy of a like idea to another, and the sum represents the force of the resolution. After severe reflection or deliberation the decision or resolution may be held to signify that we have resolved, to the best of our ability, the complex equation set us.

Though reflection is a process of mental activity that takes place within consciousness, yet consciousness itself, when fairly examined, will show how limited is the power of the mind over the train of its ideas. The formation of an idea is an organic process that takes place by imperceptible degrees beyond the range of consciousness; the idea, when formed, exists in a latent, quiescent or dormant state: and it may even be made active, and its energy duly expended, without consciousness. In like manner the catenation of a group or series of ideas is an organic process of which consciousness has no knowledge, and over which volition has no control; once firmly linked together by this organized coherence, the excitation of one idea must needs bring on the excitation of the others, one after another rising above the mental horizon into consciousness and in due order again sinking below it. The power of the mind over the succession of its states is plainly at best but a limited faculty; herein corresponding with that limited control which an individual has over the phenomena of his bodily life, where conscious and unconscious, voluntary and involuntary, acts are so intimately intermixed. To make states of consciousness synonymous with states of mind, as some have heedlessly done, is scarcely less unwarrantable than it would be to assume all bodily acts to be conscious acts.

There yet remains something more to be said concerning the association of ideas. The anatomical connexions of a nerve-cell in the cerebral ganglia do, of a necessity, limit the direction and extent of its action upon other cells; for it may be deemed tolerably certain that as the conduction in nerve-fibres demonstrably does not pass from one to another except by continuity of tissue, so the activity of one cell cannot be communicated to another except along an anastomosing process. Besides this necessary limitation in the constitution of the nervous centres, there is a further determination of the manner of association by the individual life experience. "Not every thought to every thought succeeds indifferently;" but, as all ideas have been acquired by means of experience, and we have "no imagination whereof we have not formerly had sense in whole or in parts," so the relations in which ideas exist to one another in the brain must answer in some manner the order of experience; and even an individual's habit of association of ideas will witness to the influence of his particular education and surroundings. Social life would simply be rendered impossible if we could not depend upon the uniformity of the laws of nature in man as well as out of him; if one idea followed another casually, it would be all one as if one event in nature occurred without connexion with another. That one idea does seemingly follow another casually, or at any rate without recognisable coherence, justifies us, we are in the habit of thinking, in shutting a man up in a lunatic asylum; and one of the first signs of insanity confessedly is an unaccountable change in, or disruption of, the particular uniformity of an individual character. The foundation of our laws, and the maxims of life, entirely rest upon the constancy of laws in the human mind; "a prisoner who has neither money nor interest," Hume very aptly says, "discovers the impossibility of his escape as well when he considers the obstinacy of the gaoler as the walls and bars with which he is surrounded; and, in all attempts for his freedom, chooses rather to work upon the stone and iron of the one, than upon the inflexible nature of the other." Although ideas are thus as much associated in the mind by physical necessity as are cause and effect in external nature; yet, because sometimes one idea has succeeded another in our experience, and sometimes another, it is not certain always in so obscure and complex a labyrinth what idea shall in a given case ensue; only this is certain, that it shall be an idea that has been associated with it at one time or another. Necessity is, in truth, confessed in every deliberation and every act of our life.

Because each one has a certain specific nature as a human being, and because the external nature in relation with which each one exists is the same, therefore are inevitably formed certain general associations which cannot, without great difficulty, or anywise, be dissociated, just as different movements are so linked together in all men that they cannot be dissociated. Such are what have been described as the general laws of association of ideas—those of cause and effect, of contiguity in time and space, of resemblance, of contrast; in all which ways, it is true, one idea may follow another, though also in many other ways. We are enabled, however, by virtue of the general laws of association in which all men agree, to predict the general course of human conduct, and to establish laws for the regulation of the social state. Within these general principles, however, there are numerous subordinate differences; the special character of an individual's association of ideas being determined partly by his original nature, and partly by his special life-experience.

That natural differences in the mental susceptibilities of different persons do influence the character of their association of ideas, is shown, as Dr. Priestley long since pointed out,[*] by the greater ease with which some men associate those co-existences of sensory perceptions which combine to constitute the idea of an *object*, while others associate more readily those successive sensory impressions which go to form the idea of an *event*. These different tendencies and dispositions are really at the foundation of two different types of mind. In the former case, there is a mind attentive to the discrimination of impressions, skilful in discernment, and susceptible to the pleasurable and painful properties of things—in fact, a mind good at description, and fond of natural history; in the latter case, there is a mind observant of the order of occurrence of phenomena, prone to the investigation of the genesis of things, or the connexion of cause and effect—in fact, a philosophic intellect, affecting science and abstract truth, to which an event that can be nowise explained or displayed as an evolution of antecedent causes, is a painful tribulation. Such mind is at the opposite end of the scale to that of the "poor idiot born," who, by reason of his imperfect constitution, has but few ideas, and cannot duly associate those few, just as he is capable of but few imperfectly associated movements. Forget not, however, that between the idiot at the bottom of the scale of human life, and the philosopher at its summit, there are to be met with beings representing every grade of variation.

Special adaptations to particular circumstances of life also concur to lay the foundation of individual habits of thought and conduct. The successful tact or skill of one man in circumstances in which the awkwardness or failure of another is striking, is the consequence of a rapid association of ideas which has, from repeated special experience, become so familiar, so much a habit, as to appear like an intuition. In such case the group, or series of ideas, are so closely united, so firmly organized, as to behave almost as *one* idea; while the excitation, though sufficient for the desired end, does not take place to such degree as to produce consciousness.[†] Even the instantaneous correct judgment of a much experienced and well-trained mind, which is sometimes so rapid as to look like an instinct, is founded upon a previous careful training in observation and reflection, and depends, therefore, in reality on an excellent association of ideas that has been organized in correspondence with, or adaptation to, the series of co-existences and successions in external nature; thus, even the judgment of an individual in his particular life-relations becomes almost automatic. When it is said, again, that a man's character is completely formed, we express thereby the fact that he has acquired certain definite combinations and associations of ideas which, firmly organized, henceforth avail him in the different relations of life. It is evident, then, that if we had a complete knowledge of the inner nature of an individual, if we could penetrate that most exquisitely organized fabric of thought which by reason of his particular life-experience has been grafted on the original capabilities, it would be possible to foretell with certainty his mode of thought and conduct under any given circumstances—a prediction which, as it is, those who know a man best often fail not to make, with close approximation to truth. But inasmuch as no two minds are originally exactly alike, and as no two persons have precisely similar experiences, the speciality of human conditions being infinite in variety, we cannot obtain the exact and complete elements for a correct and definite judgment of the operation of a given cause upon any individual. None the less true is it that every cause does operate definitely by as stern a necessity as any which exists in physical nature.

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[*] In his Introduction to Hartley.

[†] "Not only do simple ideas, by strong association, run together, and form complex ideas; but a complex idea, when the simple ideas which compose it have become so consolidated that it always appears as one, is capable of entering into

Once more, then, is it rendered evident how necessary to a complete psychology of the individual is the consideration of the circumstances in which he has lived, and in relation to which he has developed, as well as the observation of his habits

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combinations with other ideas, both simple and complex. Thus two complex ideas may be united together by a strong association, and coalesce into one, in the same manner as two or more simple ideas coalesce into one. This union of two complex ideas into one, Dr. Hartley has called a duplex idea. Two also of these duplex ideas, or doubly compounded ideas, may unite into one; and these, again, into other compounds without end." . . . . "How many complex or duplex ideas are all united in the idea of furniture? How many more in the idea of merchandise? How many more in the idea called Every Thing?"—J. Mill, *op. cit.* p. 82.

of thought, feeling, and action. From what has been said of ideas and their associations, it is obvious that in the same language, when used by different people, there must often be considerable difference in regard to the fulness and exactness of the ideas conveyed by it.(7) In translation from one language to another it plainly appears that ideas, which have a general resemblance, have yet certain special differences according to the depth of thought, the religion, the manners and customs of the different nations; it is as hard a matter to convey adequately in the French language the meaning of German philosophy as it is to express adequately, by the corresponding German words, the exact meaning of the French names for different shades of elegant vice or elegant cookery. And whosoever enters upon the study of psychology with the assumption that an idea deemed or called the same has always the same constant value in different people of the same nation, will be led into the vainest errors by so false a metaphysical conception. Do not men owe most of their errors and disputes to the fact that they cannot come to a right understanding of words? How should they, indeed, when by the same word is frequently signified an idea at very different stages of its evolution?

It remains only to add here, that the successive formation of ideas in mental development and the progressive complexity of their association and of their interaction in the supreme centres of the brain, do illustrate, as the development of the spinal centres and the development of the sensory centres did also, an increasing organic specialization in the relations of man to external nature; that Von Baer's law of progress from the general and simple to the special and complex here, as elsewhere in organic development, has sway.

Thus far, then, we have exhibited the path of distribution for the energy of an idea when it does not pass outwards in a direct reaction to the stimulus from without: it travels from cell to cell within the cortical layers of the hemispheres, and thus gives rise to *reflection*. But at the end of all this wandering or of the various transformations, as the final result of reflection, there may still be a reaction downwards, and consequent outward activity. When that takes place, it is *volitional* action: the will is the resultant of the complex interaction of the supreme ganglionic cerebral cells. We rise gradually up to this highest manifestation of force by following the fundamental reaction of nerve-cell through reflex action, sensori-motor action, and ideo-motor action. As, however, there is usually present in the action of will some desire of a good to be obtained, or of an evil to be shunned, it will be proper, before considering the nature of volition, to deal with the emotions. To them, therefore, shall the next chapter be devoted.

NOTES.

[1] (*p.* 109).—"For what is meant by innate? If innate be equivalent to natural, then all the perceptions and ideas of the mind must be allowed to be innate or natural, in whatever sense we take the latter words, whether in opposition to what is uncommon, artificial, or miraculous. If by innate be meant contemporary to our birth, the dispute seems to be frivolous; nor is it worth while to inquire at what time thinking begins, whether before, at, or after our birth. Again, the word *idea* seems to be commonly taken in a very loose sense by Locke and others as standing for any of our perceptions, our sensations and passions, as well as our thoughts. Now, in this sense, I should desire to know what can be meant by asserting that self-love, or resentment of injuries, or the passion between the sexes, is not innate?"—Hume, *Essay concerning the Human Understanding.*

[2] (*p.* 110).—"I cannot but think that the two main articles of belief which have been set down to the credit of the Indian—namely, the Great Spirit or Creator, and the Happy Hunting-grounds in a future world,—are the results of missionary teaching, the work of the Fathers Hennepin, Marguette, and their noble army of martyred Jesuit followers." . . . . . The Manitou, which we are obliged to translate "Spirit," exists everywhere; they believe there is a manitou in water, fire, in stars, in grass, &c.; it is the essence of Fetishism. "It is doubtful whether these savages ever grasped the idea of a human soul." . . . . "I do not believe that an Indian of the plains ever became a Christian. He must first be humanized, then civilized, and, lastly, Christianized; and, as has been said before, I doubt his surviving the operation."—*The City of the Saints*, by R. F. Burton, p. 133.

[3] (*p.* 110).—"There is no other act of man's mind that I can remember, naturally planted in him, so as to need no other thing in the exercise of it, but to be born a man and live with the use of

his five senses. Those other faculties of which I shall speak by and by, and which seem proper to man only, are acquired and increased by study and industry, and of most men learned by instruction and discipline; and proceed all from the invention of word and speech."—Hobbes, *Leviathan*, ch. iii.

[4] (*p.* 111).—"The first consideration I have upon the subject of the senses is that I make a doubt whether or no man be furnished with all natural senses. I see several animals who live an entire and perfect life, some without sight, others without hearing; who knows whether to us also, one, two, three, or many other senses may not be wanting? For if any one be wanting, our examination cannot discover the defect." "'Tis the privilege of the senses to be the utmost limit of our discovery; there is nothing beyond them that can assist us in exploration, not so much as one sense in the discovery of another." . . .

"There is no sense that has not a mighty dominion, and that does not by its power introduce an infinite number of knowledges. If we were defective in the intelligence of sounds, of harmony and of the voice, it would cause an unimaginable confusion in all the rest of our science; for, besides what belongs to the proper effect of every sense, how many arguments, consequences, and conclusions, do we draw to other things, by comparing one sense with another? Let an understanding man imagine human nature originally produced without the sense of seeing, and consider what ignorance and trouble such a defect would bring upon him, what a darkness and blindness in the soul; he will then see by that of how great importance to the knowledge of truth, the privation of such another sense, or of two or three, should we be so deprived, would be. We have formed a truth by the concurrence of our five senses; but, perhaps, we should have the consent and contribution of eight or ten to make a certain discovery of it in its essence."—Montaigne's *Essays*.

[5] (*p.* 117).—"The decay of sense in men waking is not the decay of the motion made in sense, but an obscuring of it, in such manner as the light of the sun obscureth the light of the stars; which stars do no less exercise their virtues, by which they are visible, in the day than in the night. But because among many strokes which our eyes, ears, and other organs receive from external bodies, the predominant only is sensible; therefore, the light of the sun being predominant, we are not affected with the action of the stars."—*Leviathan*, ch. vi.

[6] (*p.* 119).—"The time taken up in performing an idea is likewise much the same as that taken up in performing a muscular motion. A musician can press the keys of an harpsichord with his fingers in the

order of a tune he has been accustomed to play in as little time as he can run over these notes in his mind. So we many times in an hour cover our eyeballs, without perceiving that we are in the dark; hence the perception or idea of light is not changed for that of darkness in so small a time as the twinkling of an eye, so that, in this case, the muscular motion of the eyelid is performed quicker than the perception of light can be changed for that of darkness."—*Zoonomia*, vol. i. p. 24.

[7] (*p.* 125).—"It will easily appear from the observations here made upon words, and the associations which adhere to them, that the languages of different ages and nations must bear a general resemblance to each other, and yet have considerable particular differences; whence any one may be translated into any other, so as to convey the same ideas in general, and yet not with perfect precision and exactness. They must resemble one another because the phenomena of nature, which they are all intended to express, and the uses and exigencies of human life, to which they minister, have a general resemblance. But then, as the bodily make and genius of each people, the air, soil, and climate, commerce, arts, science, religion, &c., make considerable differences in different ages and nations, it is natural to expect that the languages should have proportionable differences in respect of each other."—Hartley's *Theory of the Human Mind*, by Dr. Priestley.

"Wherefore, as men owe all their true ratiocination to the right understanding of speech, so also they owe their errors to the misunderstanding of the same; and as all the ornaments of philosophy proceed only from man, so from man also is derived the ugly absurdity of false opinions. For speech has something in it like to a spider's web (as it was said of old of Solon's laws), for by contexture of words tender and delicate wit are ensnared and stopped; but strong wits break easily through them."—Hobbes, vol. i. p. 36.

CHAPTER VI.

THE EMOTIONS.

MAN is patient and agent; he suffers certain passions, and does certain actions: a calm deliberation involves an equilibrium between suffering and doing; but in so far as an idea is attended with some feeling, whether of pleasure or of pain, or of a more special character, it is to that extent emotional; and if the feeling preponderate, the idea is obscured, and the state of mind is then called an emotion or a passion. Strictly speaking, all conscious psychical states are, at first, *feelings;* but, after having been experienced several times, they are adequately and definitely organized, and become almost automatic or indifferent under ordinary circumstances. As long as the ideas or mental states are not adequately organized in correspondence with the individual's external relations, more or less feeling will attend their excitation; they will, in fact, be more or less emotional. When the equilibrium between the subjective and objective is duly established, there is no passion, and there is but little emotion. (1)

It has been sufficiently evident, up to the present point, that the condition of the nervous centres is of the greatest consequence in respect of the formation of the so-called mental faculties, and the manifestation of their functions; it will now be seen that this condition is of still more manifest consequence in regard to the phenomena of the emotions. Every one's experience teaches him that an idea which is at one time indifferent, being accompanied by no feeling of pleasure or discomfort, may, at another time, be attended by some feeling of discomfort, or become positively painful. And it requires no very careful observation of men to discover that different persons are very differently affected by one and the same object, and often pass very different judgments upon it in consequence. So much is this the case that we are in the constant habit of distinguishing men by the difference of their emotional disposition, or of the temper of their minds, and of speaking accordingly of one man as timid; of another as courageous; of one as irritable, quick-tempered; of another as even-tempered, placid. One of the earliest symptoms of an oncoming insanity, and one that is almost universally present as the expression of a commencing deterioration, howsoever caused, of the nervous centres, is an emotional disturbance, upon which follows more or less perversion of judgment. It is feeling, or the affective life, that reveals the deep essential nature of the man.

The first occurring observation is, that an idea which is favourable to the impulses or strivings of the individual, to self-expansion, is accompanied by a feeling of more or less pleasure; and that an idea which betokens individual restriction, which is opposed to the expansion of self, is attended with a feeling of more or less discomfort or pain. As the organic germ does, under circumstances favourable to its inherent developmental impulse, incorporate matter from without, exhibiting its gratification, so to speak, by its growth, and, under unfavourable conditions, does not assimilate, but manifests its suffering or passion by its decay; so likewise does the ganglionic nerve-cell of the hemispheres testify by a pleasant emotion to the furtherance of its development, and declares in a painful feeling of discomfort the restriction or injury which it suffers from an unfavourable stimulus. Even in the earliest sensation, therefore, the existence of pain or pleasure is a sort of obscure judgment on its advantage or disadvantage to the personality or self—a judgment in which, as Herbart has observed, the subject cannot yet be separated from the predicate that expresses praise or blame.[*] Among so many dangers, then, "to have a care of one's self is," in the words of Hobbes, "so far from being a matter scornfully to be looked at, that one has neither the power nor wish to have done otherwise. For every man is desirous of what is good for him, and shuns what is evil, but chiefly the chiefest of natural evils, which is death; and this he doth by a certain impulsion of nature, no less than that whereby a stone moves downwards." (²) Children and savages best exhibit in a naked simplicity the different passions that result from the affection of self by what, when painful, is deemed an ill; when pleasurable, a good.

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[*] "Ein Urtheil, in dem nur das Vorgestellte sich noch nicht von dem Prädicate, das Beifall oder Tadel ausdrückt, sondern lässt."—*Herbart.*

It is necessary to bear in mind that a stimulus, which in moderation gives rise to a pleasant idea or rather emotion, will, when too prolonged or too powerful, produce discomfort or pain, and consequent efforts to escape from it. There is then a *desire* to shun the stimulus, like as one altogether noxious is shunned; the desire becoming the *motive* or spring of action. The impulse in such case is described as desire, because there is consciousness of it; but it is without doubt the equivalent in a higher organic element of that effort which the lowest animal organism exhibits, without consciousness, in getting away from an injurious stimulus. In both instances there is, in truth, the manifestation of the so-called self-conservative impulse which is immanent in all living organic elements—an impulse or instinct, which, whatever deeper facts of intimate composition it connotes, is the essential condition of its existence as organic element. Such reaction of organic element is as natural and necessary as the reaction of any chemical compound, because as much the consequence of the properties of matter thus organically combined. When the stimulus to a hemispherical nerve-cell is not in sufficient force to satisfy the demands of the latter,—when, in fact, it is inadequate,—then there is the manifestation of its affinity or attraction by the nervous centre, an outward impulse, appetency, or striving, which, again, as it occurs in consciousness, is revealed to us as *desire, craving*, or *appetite*. There is no difference, indeed, as Spinoza observes, between appetite and desire, except in so far as the latter implies consciousness; desire is self-conscious appetite. (³) Because we have an appetite or desire for something, therefore we judge it to be good: it certainly is not because a thing is judged to be good that we have an appetite or desire for it. Here, again, there is an exact correspondence with that attraction, impulse, or striving of organic element towards a favourable stimulus manifested throughout nature, and the necessary correlate of which is a repulsion of what is unfavourable. Because the affinity is exhibited in vital structure, we are prone, when observing it, to transfer our own states of consciousness to the organic element, and, therefore, to represent it on all occasions as *striving*, by means of a self-conservative impulse or instinct, for the stimulus favourable to its growth. But the attraction is no less a physical necessity than the attraction of an acid for an alkali, of the needle to the pole, or of positive for negative electricity; if there was no stimulus, there would be no reaction on the part of the organic element; if the stimulus was in injurious excess, or otherwise unfavourable, there must be disturbance of the statical equilibrium, and a reaction of repulsion; and when the stimulus is favourable but deficient, the reaction is manifest in the display of an attraction or affinity for an additional amount, like as a non-neutralized acid will take up more alkali, or as unsatisfied appetite craves for more nutriment. Now, it is most important that we do not allow the presence of consciousness to mislead us as to what is the fundamental condition of things in the ganglionic cells of the brain. Here, as elsewhere, healthy organic element manifests its fundamental properties, pursuing the good, eschewing the ill; and consciousness is something superadded, but which nowise abolishes them. The striving after a pleasing impression, or the effort to avoid a painful one, is at bottom a physical consequence of the nature of the ganglionic cell in its relation to a certain stimulus; and the reaction or desire becomes the motive of a general action on the part of the individual for the purpose of satisfying a want, or of shunning an ill. The care of himself no man in good health has the power of neglecting.

It is obvious then, not only how desires become the motives of action, but how they are gradually evolved into their complete form out of the unconscious organic appetites. In the desire of the adult there is necessarily some sort of *conception* of what is desired, though it is at times a not very definite one; but in the child, as in the idiot, we frequently witness a vague restlessness evincing an undefined want of, or desire for, something of which itself is unconscious, but which, when obtained, presently produces quiet and satisfaction: the organic life speaks out with an as yet inarticulate utterance. Most striking is that example of the evolution of organic life into consciousness which is observed at the time of puberty, when new organs come into action; when vague and ill-understood desires give rise to obscure impulses that have no defined aim, and produce a restlessness which, when misapplied, is often mischievous: the amorous appetite thus first declares its existence. But to prove how little it is indebted to the consciousness which is a natural subsequent development, it is only necessary to reflect that even in man the desire attains to a knowledge of its aim, and to a sort of satisfaction, in dreams before it does so in real life. This simple reflection might of itself suffice to teach psychologists how far more fundamental than any conscious mental state is the unconscious mental or cerebral life. Given an ill-constituted or imperfectly developed brain at the time when the sexual appetite makes its appearance, and what is the result? None other than that which happens with the lower animal, where love is naked lust, and the sight of the female excites a desire that immediately issues in uncontrollable efforts for its gratification. Given, on the other hand, a well constituted and naturally developed brain, the sexual desire undergoes a complex development in consciousness; from its basis are evolved all those delicate, exalted, and beautiful feelings of love that constitute the store of the poet, and play so great a part in human happiness and in human sorrow. What, however, is true of these particular desires is true of all our desires: it may be fitly said, with Bacon, "that the mind in its own nature would be temperate and staid, if the affections, as winds, did not put it in tumult and perturbation;" or, with Novalis, that "life is a feverish activity excited by passion."

When the force of a stimulus is exactly adapted to the necessities of the organic element, then are the circumstances most favourable to the development of the latter; and a steady growth of it fails not to testify to the complete harmony of the relations. Or, adopting the language proper in such case to the highest relations of man, there is an equilibrium between the subjective and the objective, and no passion: there is neither a painful feeling with consequent desire to avoid a suffering, nor is there a feeling of insufficient satisfaction with consequent desire to increase or continue an enjoyment; but a steady assimilation, promoting the evolution of idea, goes favourably on: intellectual development is then most favoured. As there is no outward striving or craving in such case, the energy of the reaction to the stimulus is expended in the growth of the idea and in the reaction of it upon other ideas,—in other words, in intellectual development. Conception and desire do, therefore, stand in a sort of opposition to one another, although in every mental act they co-exist in greater or less relative degree; in every conception there is, or has once been, as previously said, some *feeling;* and again, in every distinct desire there is a *conception* of something desired. But the opposition between them is in reality a matter of the degree of formation of the idea or conception; for, whatever its nature, there is always more or less feeling with it when first experienced, which, however, disappears in proportion as it becomes definitely organized: and even though some little feeling or desire remains connected with the idea, it may often remain in consciousness, or only modify reflection, not being of sufficient degree to pass into outward reaction. May we not then justly affirm, as we clearly perceive, that the intellectual life does not supply the motive, or impulse, to action; that the understanding, or reason, is not commonly the cause of our outward actions, but that the desires are? Men of great reasoning powers are notoriously not unfrequently incapacitated thereby from energetic action; they balance reasons so nicely that no one of them outweighs another, and they can come to no decision: with them, as with Hamlet, meditation paralyses action. In fact, the power of the understanding is inhibitory, and is exhibited rather in the hindrance of passion-prompted action, and in the guidance of our impulses, than in the instigation of conduct; its office being in the individual as in the race, according to Comte, not to impart the habitual impulsion, but deliberative.(4)

As there are two elements which go to the production of an emotion—namely, the organic element and the external stimulus—it is plain that the character of the emotional result will not be determined only by the nature of the stimulus, but will depend greatly also upon the condition of the organic element. The equilibrium between the individual and his surroundings may, in fact, be disturbed by a subjective modification, or an internal commotion, as well as by an unwonted impression from without. When some bodily derangement has affected the condition of the cells of the cerebral ganglia, either directly or by a reflex or sympathetic action, then an idea arising is accompanied with certain emotional qualities, though it is an idea which, in health, is commonly indifferent; just as when a morbid state of an organ of sense, or of its sensory ganglion, renders painful an impression which in health would be indifferent or even agreeable. The drunken man, at a certain stage of his degradation, gets absurdly emotional; every one's experience teaches how much his tone of mind varies according to his bodily states; and the general paralytic, whose supreme nervous centres are visibly degenerate, is characterised by great emotional excitability, as well as by intellectual feebleness. The general feeling of well-being which results from a healthy condition of all the organs of the body, which is indeed the expression of a favourably proceeding organic life, is known as the *cœnæsthesis*, and is sometimes described as an emotion: but it is not truly an emotion; it is the body's sensation or feeling of its well-being, and marks a condition of things, therefore, in which activity of any kind will be pleasurable—in which an idea that arises will be pleasantly emotional, not otherwise than as bodily movement then is pleasurable. On the other hand, the general feeling of discomfort which follows upon a visceral disturbance or any other cause, is a condition in which activity of any kind will be rather painful than otherwise; there is a restricted or hindered personality, and an idea arising is apt to be gloomily emotional. It plainly amounts to the same thing, whether an excessive stimulus acts upon the nervous element when in a stable and healthy state, and produces suffering; or whether a natural stimulus acts upon it when in an enfeebled or unstable condition, and similarly gives rise to suffering: in both cases, there is, physically speaking, a disturbance of the equilibrium of the nervous element, or a resolution of it into lower but more stable compounds; or, psychologically speaking, there is, in both cases, an idea excited which is attended with painful emotional qualities—an idea unfavourable to individual expansion. In both cases the pain is the cry of organic element for deliverance. The greater the disturbance of nervous element, however produced, the more unstable is its state; and an instability of nervous element, implying, as it does, a susceptibility to rapid molecular or chemical retrograde metamorphosis, furnishes the most favourable conditions for the production of emotion, passion, or *commotion*, as the term was of old. It is easy to perceive, then, how it is that great emotion is exceedingly exhausting—for the same reason, in fact, that repeated electrical discharges by the gymnotus or torpedo produce exhaustion; it is easy to perceive, also, that whatever cause, moral or physical, works an exhausting or depressing effect upon an individual, inclines him to become emotional.

The *original* nature of nerve element is, however, as nothing in the determination of the special character of the higher emotions, compared with its *acquired* nature as this has been slowly organized in relation to the circumstances of life. Much discussion has taken place as to whether an emotion is merely a feeling of pleasure or pain accompanying a particular idea; whether, for example, benevolence is nothing more than the pleasant feeling that accompanies the idea of accomplishing the good of another, malice the feeling that attends the idea of injuring another, and so on. But there is some danger here of being confused or misled by words; it certainly must be allowed that there is something in the emotion more special than the general feeling either of pleasure or pain: such feeling is present, no doubt, but it does not determine the special character of the emotion; it is something superadded, which determines only the agreeableness or disagreeableness of the emotion. It is, in reality, the specific character of the idea which determines the specific character of the emotion; and accordingly emotions are as many and various as ideas. (5) And it has been before shown that the character of the idea is determined by the nature of the impression from without, and by the nature, as it has been modified by a life experience, of the reacting nervous centre: this now containing an organization of ideas as its acquired nature, or as the expression of its due development. How difficult it is to explain matters from a psychological point of view, is easy to perceive; while we are in such case considering the relation of emotion to idea, they are both concomitant effects of a deeper lying cause. As there are subjective sensations, so also are there subjective emotional states. It depends upon the nature of the fundamental elements, the internal reacting centre, and the external impression, whether in a given case we shall have a definite idea with little or no emotional quality, or whether we shall have the emotional quality so marked that the idea is almost lost in it. The hemispherical cells are confessedly not sensitive to *pain;* still they have a sensibility of their own to ideas, and the sensibility which thus declares the manner of their affection is what we call emotional. And as there may be a hyperæsthesia or an anæsthesia of sense, so also there may be a hyperæsthesia or an anæsthesia of ideas. Certainly there do not appear to be satisfactory grounds either in psychology or physiology for supposing the nervous centres of emotion to be distinct from those of idea.

As we justly speak of the *tone* of the spinal cord, by the variations of which its reactions are so much affected, so we may fairly also speak of a *psychical tone,* the tone of the supreme nervous centres, the variations of which so greatly affect the character of the mental states that supervene. And as it appeared when treating of the spinal cord that, apart from its original nature and accidental causes of disturbance, the tone of it was determined by the totality of impressions made upon it, and of motor reactions thereto, which had been organized in its constitution as faculties; so with regard to the supreme centres of our mental life, from the residua of past thoughts, feelings, and actions, which have been organized as mental faculties, there results a certain psychical tone in each individual. This is the basis of the individual's conception of the *ego*—the affections of which, therefore, best reveal his real nature—a conception which, so far from being, as is often said, fixed and unchanging, undergoes gradual change with the change of the individual's relations as life proceeds. Whosoever candidly reflects upon the striking modification, or rather revolution, of the *ego,* which happens at the time of puberty both in men and women, will surely not find it hard to conceive how the self may imperceptibly but surely change through life. The education and experience to which any one is subjected likewise modify, if less suddenly, not less certainly, the tone of his character. By constantly blaming certain actions and praising certain others in their children, parents are able so to form their character that, apart from any reflection, these shall ever in after-life be attended with a certain pleasure; those, on the other hand, with certain pain. Experience proves that the customs and religions of different nations differ most widely; what one nation views as crime, another praises as virtue; what one nation glorifies in as a legitimate pleasure, another reprobates as a shameful vice: there is scarcely a single crime or vice that has not been exalted into a religious observance by one nation or other at one period or other of the world's history. How much, then, is the moral feeling or conscience dependent upon the due educational development of the mind! (6)

The manner in which music affects some people, producing a lively feeling of immediate pleasure, calming mental agitation and exalting the mental tone, and thereby indirectly much affecting mental activity, affords an excellent example of a marked effect upon the psychical tone by means of physical agency; it might be adduced, if it were necessary, to attest the corporeal nature of the process. Such sentiments as the love of wife and the love of children, various as they are in kind and degree in different persons, are not definite emotions so much as the general tone of feeling resulting from certain relations in life; they represent a mental state in which ideas in harmony with the tone of mind will be attended with a pleasant emotion, and ideas discordant with it with a painful emotion, just as harmony in music produces pleasure and discord produces pain. Again, the æsthetic feelings are without question the result of a good cultivation, conscious development having imperceptibly become a sort of instinctive endowment, a refinement to which vulgarity of any kind will be abhorrent; they are the bloom of a high culture, and, like the cœnæsthesis, represent a general tone of mind which cannot be described as definite emotion, but in which certain ideas that arise will have pleasant emotional qualities. Reflect, again, on the powerful effects which the aspects of nature produce upon philosophic minds of the highest order. The vague mysterious feelings which such minds have, as instinctive expressions of their fellowship with nature, thrills of that harmonious sympathy with events whereby an indefinite feeling of joy transports them in view of certain of her glories, or a dim presentiment of evil oppresses them under different relations—these are vague psychical feelings that in reality connote the highest intellectual acquisition; they are the consummate inflorescence of the highest psychical development, the supreme harmonies of the most exalted psychical tone.

It is most necessary clearly to realize how much, not the cerebral centres only, but the whole system of bodily nerves, are concerned in the phenomena of the emotional life. The beatings of the heart, the movements of respiration, the expressions of the countenance, the pallor of fear, or the flush of anger, and the effects upon all the secretions and upon nutrition—all these evince with certainty that the organic life participates essentially in the manifestation of emotion. Before definite paths of association of ideas, and groups of ideas, have been organized through culture and experience, every emotion tends to react directly outwards, either upon the organs of the organic life or upon the organs of the animal life. In children and savages simple emotions are observably easily excited, and as readily manifested in outward display; it is only when a strong character has been fashioned that the power exists to retain the emotional energy within the sphere of the intellectual life; and even in the strongest character it sometimes happens that an emotion, too powerful or too suddenly excited, will escape control. It has now been sufficiently demonstrated, by observation and experiment, that the cerebro-spinal system does exercise an influence over the ganglia immediately concerned in the phenomena of the organic life; and it is quite in accordance with physiological observation, therefore, to admit that the commotion in the nervous element of the supreme centres, which an emotion implies, will affect the nervous centres of the organic life, and through them the organic movements, or the more intimate processes of nutrition.* In fact, what has long been popularly observed of the manner of action of the emotions, the experiments of Pflüger, Bernard, and others, on the influence of the cerebro-spinal system over the small arteries; and those of Lister, on the movement of the pigment granules in the stellate cells of the frog's skin, may be said to have experimentally demonstrated. Though a moderate stimulation of the cerebro-spinal system appears to favour or increase the action of the organic centres, yet it admits of no question that an excessive irritation of the higher centres does produce an inhibitory effect upon their functions; wherein, again, we may perceive a sufficient reason of the disease in an organ which is sometimes the result of a prolonged depressing passion. And because the weak organ is ever the sufferer, because here, as elsewhere, to be weak is to be miserable, the effect of a passion is generally experienced in his affected organ by one who is the subject of any local idiosyncrasy; it more easily sympathises with the centric commotion. Passion, in its essential nature, really betokens the sympathy of the whole nervous system; and a great disposition to passion means a great disposition to such sympathy. It is true that, in consequence of cultivation, the effects of an emotion are usually limited to a certain group of muscles, or to some other definite activity; but the less the culture, the more general are the visible effects of emotion or passion: in the idiot an explosion of passion is sometimes an explosion of convulsions.

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* It is hard to conceive how it should fail to do so, if it is true that nerves end in the parts they supply by an actual continuity of substance, as is now maintained.

But there is another important consideration with regard to our emotions. When we put ourselves in the attitude that any passion naturally occasions, it is most certain that we acquire in some degree that passion. In fact, as we complete our intellectual activity by the participation of the sensory centres, thereby rendering our abstract ideas definite through a sensory representation of them, so in our emotional life any particular passion is rendered stronger and more distinct by the existence of those bodily states which it naturally produces, and which in turn, when otherwise produced, tend to engender it. Mr. Braid found, by experiment on patients whom he had put in a state of *hypnotism*, that by inducing attitudes of body natural to certain passions he could excite those passions. We perceive, then, how close is the sympathy or connexion between the organic system and the emotional or affective life, which supplies the habitual impulsion to activity; while the intellectual life which, as deliberative, controls and directs the activity of the individual, has the closest relations with the senses. It was the recognition of the intimate connexion and mutual reaction between the passions and the bodily life that moved Bichat to locate the passions, as the ancients did, and in common language is now sometimes done, in the organs of the organic life. But although there was the just acknowledgment of a truth in this view, it was only part of a truth; for, in the first place, not the organs of the organic life only, but those also of the animal life, are concerned in the expression and production of passion; and, in the second place, the feeling of the passion unquestionably takes place in the brain. It is the display of its organic sympathies. Consequently, it is found that, as the effect of a depressing passion is felt by the victim of a local idiosyncrasy in his weak organ, so inversely the effect of a weak or diseased organ is felt in the brain by an irritability or disposition to passion, a disturbance of the psychical tone. The phenomena of insanity will furnish the best illustrations of this sympathetic interaction.

It may be thought, perhaps, that it would not be amiss if something were now said of the difference between passion and emotion, inasmuch as the terms have hitherto been used almost indifferently. This, however, is scarcely necessary in dealing only with their general nature, which is fundamentally the same; every so-called emotion, when carried to a certain pitch, becomes a veritable passion. If it were thought well to distinguish them in a special analysis of the particular emotions, as it doubtless would be, the ground of distinction would be in the *egoistic* or *altruistic* character of them—names by which Comte distinguishes respectively those feelings which have entire reference to self and those which have reference to the good of others. Spinoza, whose admirable account of the passions has never yet been surpassed, and certainly will not easily be surpassed, only recognises three primitive passions, on the basis of which all others are founded—joy, sorrow, and desire. (*a*) Desire, he says, is the very nature or essence of the individual, whence it is that the joy or sorrow of each individual differs from that of another as the nature or essence of one differs from that of another. (*b*) Joy is the passage from a less degree of perfection to a greater degree of perfection, and accompanies, therefore, all actions that are called *good*. (*c*) Sorrow is the passage from a greater degree of perfection to a less degree of perfection, and accompanies all acts that are called *evil*. It will easily be understood, from what has been

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already said, how much the particular character of a passion will depend upon the education; how, according to the difference of his education and circumstances, one man may repent bitterly of an act of which another boasts exultantly.

Here, again, it is rendered evident how impossible it is to deal satisfactorily with the emotions by considering them only as accomplished facts, and grouping them according to their characters as we observe them in the adult of ordinary cultivation. We are driven by the psychological method to study emotion under great disadvantage, having to examine the complexity of an advanced development instead of following up, as is the true method, the genesis of emotion or the plan of its development. In the classification of the animal kingdom the study of its plan of development is now acknowledged to be the only method of settling the true relations between one animal and another: in like manner the phenomena of mind can only be rightly grounded by an analysis of their development. Whosoever aspires to give an adequate account of the emotions must devote himself, then, to a careful investigation of their simplest manifestations in the higher members of the animal kingdom, of the different grades of their evolution in the savage and the civilized person, in the child and the adult, the woman and the man, the idiot and him who is in his right mind, and patiently unfold that progressive specialization and increasing complexity which prevail here as in every other department of organic development. Like as ideas are blended, or coalesce, and connected in groups and series so that by complex development a character is formed, so are the *feelings* belonging to the ideas and the *desires* accompanying them blended and grouped in a corresponding complexity, and inclinations or disinclinations of every variety and complexity are thus formed as a part of the character. Again, the desire naturally attaching to a certain aim is often transferred after a time to the means by which that aim is attained, so that there ensue in this way manifold secondary formations: the end of wealth is to give enjoyment and comfort; but how often does a passion for the means oversway the end! By looking to the end which is desirable, an act naturally very distasteful, but which is necessary as means, may, by habituation, be rendered indifferent or even pleasing; and many scoundrels are thus gradually fashioned, themselves unaware of the grievous issue in which many slight effects have imperceptibly culminated.*

As it is in the individual, so it is through generations. The internal organic adaptations which take place in correspondence with differences in the external conditions of existence, are sometimes observedly propagated through generations, and that which was a conscious acquisition in the parent becomes more or less an innate endowment of the offspring. It seems to admit of little doubt that this law works in the improvement of the human brain in the course of generations: as those who migrate from their native land to other and different climes do in course of time endow their progeny with an inherent adaptability to the new conditions, so that they do not perish, but flourish in them; or as the young fox or young dog inherits as an instinct the cunning which its ancestors have slowly acquired by experience; so do such records as are available prove that the brain of man has undergone considerable development in the course of generations. Between the inborn moral nature of the well-constituted civilized person and the brutal nature of the lowest savage, all question of education and cultivation put aside, the difference as a physical fact is not less than that which often exists between one species of animal and another. The exalted ideas of justice, virtue, mercy—which are acquired in the course of a true civilization, and which the lowest savage has not—do, without doubt, add something to the nervous endowment of succeeding generations; not only is there in their constitution the potentiality of such ideas, which there is not in the lowest savage, but there is generated an instinctive quality of mind, an excellent tone of feeling, which rebels against injustice of any kind: there is formed the potentiality of a so-called *moral sense*. Thus it is that the individual rightly developing in his generation is, by virtue of the laws of hereditary action, ordaining or determining what shall be pre-ordained or pre-determined in the original nature of the individual of a future age. But are we then to lose sight of the physical aspect of this development? Certainly not; the moral feeling betokens an improved quality, or higher kind of nervous element, which ensues in the course of a due development, and which may easily again be disturbed by a slight physical disturbance of the nervous element. In the exaltation of mankind through generations, in the progress of humanization, so to speak, this height of excellence is reached: in the deterioration or degeneration of mankind, as exhibited in the downward course of insanity proceeding through generations, one of the earliest evil symptoms is, as we shall hereafter see, the loss of this virtue—the destruction of the moral or altruistic feeling.

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* *Nemo repente fuit turpissimus* is really the expression of the physical nature of the growth of character.

"Custom . . . .
. . . .
Constrains e'en stubborn Nature to obey;
Whom dispossessing oft he doth essay
To govern in her right; and with a pace
So soft and gentle does he win his way,
That she unawares is caught in his embrace,
And tho' deflowered and thralled nought feels her foul disgrace."

Stanza of Gilbert West, quoted by Coleridge in his *Biographia Literaria*.

The intimate and essential relation of emotions to the ideas, which they equal in number and variety, is sufficient to prove that the law of progress from the general and simple to the special and complex, prevails in their development. If such relation were not a necessary one, it would still be possible to display that manner of evolution from a consideration of the emotions themselves. And the recognition of this increasing specialization and complexity in the function compels us to assume a corresponding development in the delicate organization of the nervous structure, although by reason of the imperfection of our means of investigation we are not yet able to trace a process of such delicacy in these inmost recesses to which our senses have not gained entrance.

NOTES.

[1] (*p.* 129).—"Notre âme fait certaines actions et souffre certaines passions; savoir: en tant qu'elle a des idées adéquates, elle fait certaines actions; et en tant qu'elle a des idées inadéquates, elle souffre certaines passions."—Spinoza, *Des Passions*, Prop. I.

[2] (*p.* 131).—"Among so many dangers, therefore, as the natural lusts of men do daily threaten each other withal, to have a care of one's self is so far from being a matter scornfully to be looked upon, that one has neither the power nor wish to have done otherwise. For every

man is desirous of what is good for him, and shuns what is evil, but chiefly the chiefest of natural evils, which is death; and this he doth by a certain impulsion of nature, no less than that whereby a stone moves downwards."—*Hobbes*, vol. ii. p. 8.

[3] (*p.* 131).—"Le désir, c'est l'appétit, avec conscience de lui-même. Il résulte de tout cela que ce qui fonde l'effort, le vouloir, l'appétit, le désir, ce n'est pas qu'on ait jugé qu'une chose est bonne: mais, au contraire, on juge qu'une chose est bonne par cela même qu'on y tend par l'effort, le vouloir, l'appétit, le désir."—Spinoza, *Des Passions*, Schol. to Prop. ix.

[4] (*p.* 134).—"But we must frankly admit, on consideration, that the political rule of intelligence is hostile to human progression. Mind must tend more and more to the supreme direction of affairs; but it can never attain it, owing to the imperfection of our organism, in which the intellectual life is the feeblest part; and thus it appears that the real office of mind is deliberative; that is, to moderate the material preponderance, and not to impart its habitual impulsion."—Comte, *Positive Philosophy*, vol. ii. p. 210.

[5] (*p.* 136).—"For it is not his disputations about pleasure and pain that can satisfy this inquiry; no more than he who should generally handle the nature of light can be said to handle the nature of particular colours; for pleasure and pain are to the particular affections as light is to particular colours."—Bacon, *De Augment. Scient.*

"Autant il y a d'espèce d'objets qui nous affectent, autant il faut reconnaître d'espèces de joie, de tristesse, et de désir; et en général de toutes les passions qui sont composées de celles-là, comme la fluctuation, par exemple, ou qui en dérivent, comme l'amour, la haine, l'espérance, la crainte," &c.—Spinoza, *Des Passions*.

[6] (*p.* 138).—"Mais il faut en outre remarquer ici qu'il n'est nullement surprenant que la tristesse accompagne tous les actes qu'on a continue d'appeler *mauvais*, et la joie tous ceux qu'on nomme *bons*. On conçoit en effet par ce qui précède que tout cela dépend surtout de l'éducation. Les parents, en blâmant certaines actions, et réprimandant souvent leurs enfants pour les avoir commises, et au contraire en louant et en conseillant d'autres actions, ont si bien fait que la tristesse accompagne toujours celles-là et la joie toujours celles-ci. L'expérience confirme cette explication. La coutume et la religion ne sont pas les mêmes pour tous les hommes: ce qui est sacré pour les uns est profane pour les autres, et les choses honnêtes chez un peuple sont honteuses chez un autre peuple. Chacun se repent donc ou se glorifie d'une action suivant l'éducation qu'il a reçue."—Spinoza, *Des Passions*, p. 159.

CHAPTER VII.

VOLITION.

"Les hommes se trompent en ce point qu'ils pensent être libres. Or, en quoi consiste une telle opinion? En cela seulement qu'ils ont conscience de leurs actions et ignorent les causes qui les déterminent. L'idée que les hommes se font de leur liberté vient donc de ce qu'ils ne connaissent point la cause de leurs actions, car dire qu'elles dépendent de la volonté, ce sont là des mots auxquels on n'attache aucune idée. Quelle est en effet la nature de la volonté, et comment meut-elle le corps, c'est ce que tout le monde ignore, et ceux qui élèvent d'autres prétentions et parlent des siéges de l'âme et de ses demeures prêtent à rire ou font pitié."—*Spinoza.*

"En tout ce que je puis dire à ceux qui croient qu'ils peuvent parler, se taire, en un mot, agir en vertu d'une libre décision de l'âme, c'est qu'ils révent les yeux ouverts."—*Ibid.*

IT is strange to see how some, who confidently base their argument for the existence of a God on the ground that everything in nature must have a cause, are content, in their zeal for free-will, to speak of the will as if it were self-determined and had no cause. As thus vulgarly used, the term Will has no definite meaning, and certainly is not applicable to any concrete reality in nature, where, in the matter of will, as in every other matter, we perceive effect witnessing to cause, and varying according as the cause varies.

Previous considerations must have sufficiently proved the necessity of modifying the notion commonly entertained of the will as a single, undecomposable faculty of constant and uniform power; for they have shown that under the category of voluntary acts, as commonly made, are included very different kinds of actions, proceeding from different nervous centres. A considerable proportion of the daily actions of life is confessedly due to the automatic faculty of the spinal cord; the sensory centres are clearly the independent causes of other actions; while many of the remaining actions that would by most people be deemed volitional, are really respondent to an idea or emotion. This just discrimination is, notwithstanding, entirely neglected by those who take the metaphysical view of will—by them, as usual, an abstraction from the particular is converted into an entity, and then allowed to tyrannize in the most despotic manner over the understanding. The metaphysical essence thus created has no other relation to a particular or concrete act of will, than, using Spinoza's illustration, *stoneness* to a particular stone, man to Peter or Paul.

It is obviously, then, of importance, in the first place to get rid of the notion of an ideal will, unaffected by physical conditions, as existing apart from a particular concrete act of will, which varies according to physical conditions. When a definite act of will is the result of a certain reflection, it represents physically an available or a liberated force, consequent on the communication of activity from one cell or group of cells to other cells or groups of cells within the cortical layers of the hemispheres. Any modification, therefore, of the condition of these centres may, and notably does, impede reflection, and affect the resultant power of will—a power which, in reality, is seen to differ both in quantity and quality in different persons, and in the same person, according to the varying conditions of the nervous substratum. On the other hand, if we speak psychologically, the definite will is the final issue of the process of reflection or deliberation, which a man's life-culture has rendered him capable of, and represents a *conception* of the result with *desire*, such as has been determined by the character of the reflection. A man can never will a virtuous end into whose reflection ideas of virtue do not enter, nor can any one will a bestial act of vice whose mind is not familiar with ideas of lewdness. The will appears, then, to be nothing but the desire, or aversion, sufficiently strong to produce an action after reflection or deliberation—an action that, as Hartley observes, is not automatic primarily or secondarily.*(1) Since, then, it is generated by the preceding association, it must needs differ greatly in quality and quantity, according to the extent and character of the association, as this has been established by cultivation, or is temporarily modified by bodily conditions. Every one can easily perceive this to be true of the will of an idiot or a child, which is palpably a very different matter from that of a well-cultivated adult; and he must be very much blinded by metaphysical conceptions, who fails to recognise the infinite variations in the power of will which any given individual exhibits at different times or in different relations. When one of the higher senses is wanting in any one, he necessarily wants also the ideas, feelings, desires, and will, which arise out of the perceptions of this sense. The blind man cannot know the variety and beauty of colouring in nature, nor can he will in regard to those external relations which are revealed only through the sense of sight. Because, however, he knows not what he lacks, he does not consider his will inferior in quality, less complete, or less free. Were an additional sense conferred upon any one, it would doubtless soon teach him how much might yet be added to the will, how little his boasted freedom is, and might, perhaps, make him wonder much that he should ever have thought himself free.

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* "Appetite, therefore, and aversion are simply so called as long as they follow not deliberation. But if deliberation have gone before, then the last act of it, if it be appetite, is called *will;* if aversion, *unwillingness.*"—*Hobbes.*

When is it that man is most persuaded that he speaks or acts with full freedom of will? When he is drunk, or mad, or is dreaming. It may be a reflection, then, worth dwelling upon, that man thinks himself most free when he is most a slave; but at any moment, in whatever mood he be, he would affirm that he is free. A drunken man judges very differently from what he does in his sober senses, but is he in his own estimation less free at the time? Passion notoriously perverts the judgment, warping it this way or that; but will any appeal to the passionate man elicit from him a confession that he is not acting with perfect liberty? Place the very same arguments before a man when he is elated by some joyous, or depressed by some grievous event, when he is in the full flow of vigorous health, or when he is prostrate on the bed of sickness, or of death, and how different would be his judgment upon them; but whatever others may think of him, he will hold for certain the conclusion of the moment, just as a man in his sleep is fully persuaded of the reality of his dreams. While the looker-on can often predict how a madman will act under certain circumstances, with as much certainty as he can predict an event conformable to a known law of nature,—who thinks himself so free as does the madman? Whence comes this false opinion? It arises plainly from this: that consciousness reveals the particular state of mind of the moment, but does not reveal the long series of causes on which it depends. It is a deliberate fooling of one's self to say that actions depend upon the will, and then not to ask upon what the will depends! It is as though, says Leibnitz, the needle should take pleasure in moving towards the pole, not perceiving the insensible motions of the magnetic matter on which it depends. As in nature we pass from event to cause, and from this cause again to an antecedent one, and so on till we are driven to a great first cause, so, in the sincere observation of the mind, we see that it is determined to will this or that by a cause or motive, which is again determined by another, this again by another, and so on till we have gone through the whole series of desires, aversions, hopes, and fears, the sum of which is deliberation, and that have preceded the last appetite or aversion, which we call an act of will. Those who fondly think they act with free will, says Spinoza, dream with their eyes open.

Now, if the final reaction after deliberation, which we call will, is, like other modes of reaction of nerve element previously described, a resultant of a certain molecular change in a definitely constituted nervous centre, then all the *design* exhibited in any given act of will must, like the design displayed in the function of the spinal cells, or the cells of the sensory centres, be a physical result of a particular intimate constitution or organization of nervous matter. In other words, the act of will which is the final expression of a process of reflection must needs contain a conception of the end desired—such a conception as has been determined by the nature of the reflection; the conception of the result, or the design, in the act of will constituting, in fact, the essential character of the particular volition.* The *design*, then, which a looker-on discovers in any act of will—and, be it remembered, there is no actual volition apart from the particular volition—will depend upon the nature of the individual whom he is observing, as that nature has been inherited, and subsequently developed by the experience of life. The idiocy of any one, or his congenital inability to adapt himself to external relations by correspondences of internal cerebral reaction, is a physical fact: there is no design in many of the idiot's conscious acts, because such quality or property has not been built up by cultivation as a faculty of the supreme nervous centres, a congenital defect of constitution having made such organization impossible; in other words, the idiot is, by defect of nature, incapacitated from acquiring reflection, and cannot, therefore, have in his mind the conception of a result to be attained, cannot display conscious design. But the design manifest in any voluntary act of the best cultivated mind is likewise physical necessity: in consequence of reacting cerebral adaptations to the varieties of external impressions, reflection has, as already set forth, been organized as a development of the supreme nervous centres, or, in other words, as a faculty of the mind; and according to the extent and kind of the reflection will be the completeness of the conception of the end to be attained, or the degree of design discoverable in any act of will. The particular volition and whatever it contains, whether of folly or design, is a product of the organized residua of all former like volitions, excited into activity by the appropriate stimulus.

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* In order that desire may become action for its gratification, a consciousness of the result of the action is necessary—in other words, a conception of the aim of it. The desire, therefore, gives the special impulse, and the particular act of will is not the determining agent, but is the result determined by the impulse acting in conformity with the conception of the aim to be attained.

It has been necessary to lay stress upon this troublesome question of design, because mistaken notions with regard to it appear to have been at the bottom of much error in philosophy. The design manifest in a mental act has been supposed to evince a power which transcended or anticipated experience, instead of one that actually conforms in its genesis to experience; and the metaphysical conception of will as a fixed and undecomposable entity, in which was no variability nor the shadow of a turning, is greatly indebted for its origin to that error. The mischievous doctrine of final causes which Bacon, Comte, Spinoza, Descartes, and others scarcely less great, all agree to have done so much harm in philosophy, has sprung from erroneous views of the nature of design. Supposing that the argument from design as to the existence of will as a metaphysical entity were pressed to its logical consequences, what must be the result? Nothing less than this,—that the animal, with its marvellous instinct of instant adaptation to the most complex and unfamiliar conditions, is possessed of a higher immaterial principle than the helpless child or the erring adult. We know right well, however, that the instinct of the animal is sometimes positively traceable to the acquired power of former generations; that it has been observably built up in the constitution of the nervous centres, and then transmitted as an innate endowment. It is exactly the same with the design that is formed within the term of an individual life, and which ever testifies to the previous cultivation of the individual; the more cultivated the mind and the more varied the experience, the better developed is the will and the stronger its co-ordinating power over the thoughts, feelings, and actions, not otherwise, in truth, than as the co-ordinate reflex action of the spinal cord is developed by experience and culture. Design, therefore, when its nature is fairly analysed, so far from tending to make the will a fixed metaphysical entity, goes really to prove that the will is an insensibly organized result, of varying value.

Having now adduced sufficient reasons to prove that the will is not a self-generating, self-sufficing force of constant quantity, but, on the contrary, a force varying in quantity and quality, and, like every other natural force, determined by antecedent causes, we may proceed to consider what power it actually has in our mental and bodily life. It is manifestly ordained that the will, as the highest mode of energy of nerve element, should control the inferior modes of energy by operating downwards upon their subordinate centres: the anatomical disposition of the nervous system is in conformity with what psychological observation teaches. But the undoubted fact, that the will of a man can and does control inferior functions, has led to a very extravagant and ill-founded notion as to its autocratic power; and it must be allowed that not a little windy nonsense has been written concerning its authority. Assuredly it is no irresponsible despot in any mind, but is ever most obedient where it has most power; it conquers by obeying. Let us, then, consider what the power of the will is (1) over the movements, and (2) over mental operations, the two departments in which its rule is felt.

1. (*a*) The will has no power whatever over certain movements that are essential to the continuance of life. Not only do such motions as those of the heart and the intestines go on without any co-operation of the will and in spite of any intervention on its part, but movements that are only microscopically visible, such as the contractions of the small arteries, which are of so great importance in nutrition, are not under its direct influence. Nature has been far too prudent to rely upon such an uncertain force for the movements essential to the continuance of life, or to admit its injurious interference: let a man try to asphyxiate himself by voluntarily restraining the respiratory movements, and he will learn a lesson as to the impotency of will which he might usefully remember when studying mental phenomena. We say nothing here of those insensible molecular movements of the physiological elements which, like thermal oscillations, are yet impenetrable to sense, but which are undoubtedly at the foundation of all visible vital actions.

(*b*) The will has no power to effect movements that are confessedly voluntary, until they have been very carefully acquired by practice. Every one knows that the theory of a particular skill of movement is a very different matter from the practice of it, and that the complete capacity of accomplishing the act is gained, not simply by desiring and willing it, but by patient exercise and cultivation; the faculty of the movement is thus gradually organized in the proper nervous centre. A special and complex act, never hitherto attempted, will be as little likely to be carried out, in obedience to the commands of the so-called "autocrat of the mind," as a determination to fly.*

(*c*) When the will does dictate a movement, it is the *event* which is determined; it has no direct control over the means by which the result is effected; so that it may even happen, and does happen, that in a man struck with a palsy of his limbs, the will, all unaware of its impotency, commands a result which never takes place. Questionless some would still not shrink from affirming that consciousness never deceives. When the will dictates a certain event, its power is propagated, first through certain nerves, and then through them to certain muscles, in a manner of which we have no consciousness whatever: all we do know is, that if we wish to select a certain muscle, and put it singly in action, we have not the power to do so, and that, if certain movements have been habitually associated, it is a very hard matter to dissociate them—a thing which a simple effort of the will certainly will not do, but which a disease like chorea will sometimes do in spite of the will.

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* "We know how slowly the child acquires the power of so balancing his body as to hold it erect." . . . . "We observe how slowly the child learns to perform, with the requisite precision, the contractions on which the operation of walking depends." . . . . . "There is another very familiar instance, that of learning to write."—J. Mill, *Analysis of the Human Mind*, p. 271-273.

2. The extent of voluntary power over the mental operations is not nearly so great as is popularly assumed; much the same thing happening here as in its influence over movements. It will not be difficult to understand how this should be so, if we reflect that the immediate action of the will, even when dictating movements, is not upon muscles, but upon the motor grey nuclei, or the nervous centres of movement; that in both cases, therefore, the immediate operation is alike upon ganglionic cells, which are, in one case, the centres of ideas, in the other the centres of movements.(2)

(*a*) As the formation of our ideas gradually takes place through experience, and as the association between ideas is also effected in accordance with experience, both processes being based in the organic life and beyond the domain of consciousness, it is plain that the will does not determine either the material of thought or the laws of the interworking of ideas: it must accept as accomplished facts, as organized results, the ideas and the manner of their association. As with movements, so here, the will has no control over the means by which it works: it cannot dissociate firmly established connexions, nor can it determine a new train of ideas without the first link of it being in the thoughts; and when the first link, however originated, is, so to speak, grasped, the train of ideas initiated is not irregular and alterable at will, but definite, in stern accordance with an order and system previously established by cultivation.* The will

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[*] "Deliberation and investigation are like the hunting of a hound; he moves and sniffs about by his own activity, but the scent he finds is not laid, nor the trail he follows drawn by himself. The mind only begins a train of thinking, or keeps it in one particular track, but the thoughts introduce one another suc-

thus presupposes definite and fixed series of ideas formed in the mind, series in which, without individual co-operation, one idea must definitely and of necessity follow another as one wave necessarily produces another as itself disappears. There is an order or a necessity in the mental organization of a sane person, then, reflecting the order or necessity in the co-existence and succession of events in external nature; and the will can as little control the fundamental laws of the one as it can those of the other. Certainly it is not absolutely powerless in the mind, any more than it is absolutely powerless in nature; by recognition of the laws that prevail it can arrange conditions so as to produce secondarily considerable modification of their action; it may thus avail itself of them for its own profit, using their power in an enlightened manner to aid its development: in the one case as in the other it conquers only by obeying.

True liberty, as Milton expresses it,—

> "Always with right reason dwells
> Twinn'd, and from her hath no dividual being."

(*b*) Thus we come to a second consideration in regard to the power of the will: it is that those who so unduly exact it do most unjustly derive their arguments entirely from the self-consciousness of a well-cultivated mind, and altogether neglect the instances of its simplest manifestations. It is simple justice to insist upon a reference to the earlier stages of development of the cultivated mind, or to mind in its least cultivated state, as offering the simplest and most favourable instance for a correct induction. Will any one be so bold as to maintain that there exists volitional control over the thoughts in the young child or in the idiot? Is any one so ignorant of the genesis of mind as to uphold the existence of true volition in the earliest stages of mental development? The child notably lives in the present, and its actions are direct reactions to the feelings and ideas that are excited in its mind.

(*c*) But as the will cannot originate an idea or a train of thought, so likewise it is unable sometimes to dismiss one when desirous of doing so. A painful idea will, as every one's expe-

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cessively . . . . which shows they have a motion of their own independent of the mind, and which they do not derive from its action, nor will lay aside upon its command."—Tucker's *Light of Nature*, vol. i. p. 14.

rience must have taught him, return again and again into consciousness notwithstanding every effort of the will to get rid of it, just as a movement may take place in spite of the will. The command which a man has over his thoughts is very different at different times, and one man may be able to dismiss a troublesome reflection when another cannot for the life of him do so. We can give no exact reasons for these variations; the causes of them lie deeper than consciousness can reach or will control. So far, then, from the will being autocratic, it is at the mercy of unknown conditions, which may seriously affect at any moment its power or energy. Moreover, when an unwelcome idea is dismissed from the mind, it is not done by a simple despotic order of the will; but by fixing attention on some other idea which arises—by maintaining the tension of it, the latter is made consciousness; and as two ideas cannot exist in consciousness at the same time, or at any rate cannot co-exist in equal intensity, that implies the dismissal of the former idea into the background and the initiation of a new current of reflection—a current that in such case, however, is not uncommonly interrupted by the irruption of the old idea, which refuses to become latent or dormant. Volitional control exercised over the thoughts manifestly presupposes the existence of many ideas in the mind, and the possibility of some of these latent ones arising to influence those that may be active. *Denken macht frei.* What power it is by which one idea calls up another we do not know, but we do know that it is not by the will.

Locke is admitted to have made a great advance in psychology when he demonstrated that there were no innate ideas in the mind, but that all its ideas were formed by observation and reflection. The necessary consequence of his demonstration plainly is, what the foregoing considerations have shown, that there is no inborn will in the human mind. It would be a very difficult matter to fix that period in the child's mental development when volition might be acknowledged to have distinctly manifested itself. Whence and when the first volition comes, would indeed be perplexing questions if the will were admitted to be a special faculty of the mind, distinct from other faculties, of constant quality, and never falling below a certain level of energy. Why is it that we are powerless to fix the time of the first volition? Because the will is not *one* and constant, but infinitely variable in quantity and quality, having many nervous centres, and not having any existence apart from the concrete act. There are in reality as many centres of volitional reaction in the brain as there are centres of idea; and to assume *one* constant will is a part of that metaphysical system of making abstractions into entities by which also is made *one* understanding, *one* reason, and the mind is mischievously parcelled out into faculties that have no existence in nature. It is utterly at variance both with psychological analysis of the nature of will, and with physiological observation of the constitution of the supreme nervous centres, to assume a single nervous centre from which will proceeds; if we must make a definite statement on so obscure a matter, it is that every centre of idea may be a centre of voluntary reaction. For consider this: although we describe the effect as ideomotor when an idea reacts directly outwards, yet if the energy of the idea is not instantly so expended, but persists in the mind for a moment, so as to produce a clearer consciousness of it, before passing outwards, and especially if there is some feeling or desire attending it, then when it does pass outwards we commonly describe the effect as volitional. As consciousness may, however, exist in every degree of intensity, it is plain that we cannot definitely fix a stage at which ideational reaction may be supposed to become volitional, nor determine the nature of the change which then ensues. "The will and the intelligence are one and the same thing," is the corollary of Spinoza from his close reasoning.

Let us imagine the first appearing idea in the infant's mind to reach outwards, and to leave, as it will do, a residuum in its nervous centre; when the idea occurs again, there will be a tendency to a similar reaction. Suppose, however, that the reaction causes pain to the child, and thereupon a second idea is formed in its mind, the reaction of which is opposed to that of the first. When the first idea appears again, it will, instead of reacting outwards at once, excite the second idea into activity, which is inhibitory or preventive. That is the simplest case of volition: the child has voluntarily refrained from doing something, or voluntarily done something else; and the impulse that has prompted the choice is not any abstract power, but springs from that fundamental property of organic element by which what is agreeable is sought, what is painful is shunned. Bear in mind, when weighing volition, that there is often more power demanded for preventing or inhibiting action than for producing it. As ideas multiply in the mind, and groups or series of ideas are associated, of course the process becomes more and more complicated; the residua of volitions, like the residua of sensations or ideas, remain in the mind and render future volitions of a like kind more easy and more definite; *abstract* or *general* volitions, as it were, are formed as the representatives of certain trains or groups of ideas, or as the expression of their due co-ordinate activity; and by their persistence in the mind, when not in consciousness, and their interaction there, the character of our thought, feeling, and action, is modified in a way which we cannot comprehend. Every one must have felt that an act which was at first disagreeable and demanded a painful effort of will, may become, in fact invariably does become, after several repetitions, much less disagreeable or even an easy habit. Not only, however, does that particular act lose its painful qualities, but all acts of a like kind are made easier; and our manner of feeling with regard to them, and even our judgment concerning them, are greatly modified. Though we can give no explanation of the way in which we are aided by the traces of past volitions, it is plain enough that we are so aided; conscious acquisition becomes unconscious power; and by an organic assimilation of some kind, the will even becomes in certain relations automatic.

Three conclusions are then to be distinctly established from the foregoing considerations: first, that the will is not an innate and constant faculty, but a gradual and varying organization; secondly, that wherever an afferent nerve passes to a cell or series of cells in the cortical layers of the hemispheres, and an efferent nerve issues from the cell or series of cells, there is the possible or actual centre of a particular volition; and thirdly, that volition or will, used in its general or abstract sense, does not denote any actual entity, but simply expresses the due co-ordinate activity of the supreme centres of mental force, not otherwise than as the co-ordinate activity of the spinal cord or medulla oblongata might be said to represent its will—the faculty in both cases being commonly an acquired one in man.

When the animal acts in answer to some stimulus with direct and definite purpose, or, as we are in the habit of saying, instinctively, it does so by virtue of an endowment of its nervous centres, which is original in it, but which in the formation of human volition is being gradually acquired, and which, if we only go far enough back through generations, may sometimes be seen to be acquired by the animals. It would less belie observation to place an ideal entity behind the innate instinctive impulse of the animal than behind the gradually fashioned will of man.

To the free action of will in an individual two conditions are obviously necessary: first, an unimpeded association of ideas whereby one conception may readily call up another, and complete deliberation ensue; and secondly, a strong personality or character to give the decision between conflicting ideas and desires. We shall say something of the second condition first.

The strong or well-formed character which a well-fashioned will implies, is the result of a good training applied to a well-constituted original nature; and the character is not directly determined by the will, but in any particular act directly determines the will.* The way in which the will does operate upon the character, or affect the *ego*, is indirectly by determining the circumstances which subsequently gradually modify it; we may place ourselves voluntarily in certain conditions of life, but all the energy of the strongest will cannot then prevent some degree of modification of character by them—cannot prevent an equilibration taking place. In any future act of will the altered character, or acquired nature, is expressed; and while we, perhaps, all unaware of any change, strenuously uphold our constancy, a looker-on clearly perceives the difference. What we call the *ego*, is in reality an abstraction in which are contained the residua of all former feelings, thoughts, volitions, —a combination which is continually becoming more and more complex. That it differs at different times of life, and in consequence of different external relations, those who would most zealously uphold its so-called identity do unconsciously admit when they acknowledge that, through religious influence or otherwise, any one may be made "quite another man," may be "converted," or be "regenerate." When the *ego* is transformed in correspondence with changed external circumstances, the changes are so gradual as to be imperceptible at the time; but a rapid transformation of the *ego* may sometimes be effected by a great event, internal or external, as, for example, when, with the development of puberty, new ideas and impulses penetrate the old circle and become constituent parts of it, producing no little subjective disturbance until the assimilation is completed and an equilibrium established. When a great and sudden revolution in the *ego* is produced by an external cause, it is most dangerous to the mental stability of the individual, and very apt to become pathological: nothing is more dangerous to the equilibrium of a character than for any one to be placed in entirely changed external circumstances without his inner life having been gradually adapted thereto; and madness, when its origin is fairly examined, always means discord between the individual and his circumstances. He who, having unexpectedly received a sudden great exaltation in life, is not made mad by his good fortune, cannot realize his new position for some time, but gradually grows to it; he who from some subjective cause believes that he has received a great exaltation in life while external circumstances are not correspondent, is mad—the transformation of his *ego* being pathological.

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* Common language, Tucker observes, implies two wills or more, opposing, impeding, restraining, and mastering one another; when an inordinate passion interferes with the prosecution of some design, we still regard it as a voluntary result, because sensible of the instigation. "But if we listen to the common discourses of mankind, we shall find them speaking of several wills, several agents, in the same person, resisting, counteracting, overpowering, and controlling one another; hence the so usual expressions of the spiritual and carnal wills, of the man and the beast, of self-will and reason, of denying our wills, subduing our passions, or being enslaved by them, of acting unwillingly or against the will, and the like. All which takes rise from a metonyme of the cause for the effect; for our actions being constantly determined either by the decisions of our judgment, or solicitations of our desires, we mistake them for the will itself; nor is it a little confirmation of the will being actuated by motives, to find them so intimately connected therewith, that a common eye cannot distinguish them apart."—*Light of Nature*, i. 547.

The history of a man is the true revelation of his character: what he has done indicates what he has willed; what he has willed marks what he has thought and felt or the character of his deliberations; what he has thought and felt has been the result of his nature then existing as the developmental product of a certain original constitution and a definite life experience. Objectively considered, the identity of the *ego* is neither more nor less than the identity of the full-grown oak with the first slight shoot from the acorn: subjectively considered, the strong and sure conception which every one has of the *ego*, is not surprising, inasmuch as it is the most frequently active idea, being concerned with more or less consciousness in every event of his life, being that to which every action has fundamental reference. The fashioning of the will is the fashioning of the character; and that can be done only indirectly by fashioning the circumstances which determine the manner of its formation. But however formed, it is the character which determines what the judgment shall decide to be most eligible, the inclination prompt as most desirable, and the will effect. If it were possible for anyone to enter thoroughly into the inmost character of another person, and to become exactly acquainted with the moving springs of his conduct in his particular relations of life, it would be possible not only to predict his line of action on every occasion, but even to work him, free will notwithstanding, like an automaton, by playing on his predominant passion, interest, or principle.

Secondly, there is manifestly required for the free action of the will an unimpeded association of ideas, so that the due materials for the formation of a proper judgment may be available. But the ease, completeness, and character of such association depend, as already shown, on the condition of the nervous element, very slight disorders of which accordingly quickly declare themselves in a deterioration of the will. As the secondary automatic faculties of the spinal centres soon suffer from any disorder of nerve element, and reveal their suffering in the loss of co-ordinate power over the movements, so in the loss of co-ordinating power over the ideas and feelings, in their irregular and independent reactions, is revealed the deterioration of the will. And as, when the disorder of the spinal centres is still greater, all co-ordination is lost and convulsion sensue; so in the supreme ganglionic cells of the hemispheres, when the disturbance is great, there is no co-ordination of the thoughts and feelings, convulsive reactions of the cells take place, and the individual is a raving lunatic, or a dangerous one dominated by a few persistent morbid ideas. Volition is, as it were, resolved into the inferior constituents, out of which it is in the due course of things compounded, as a ray of white light may be decomposed into several coloured rays; and in place of the definite, calm, co-ordinate activity of well-formed will, there is the aimless, irregular, explosive display of inferior activity. It is obvious, however, that even in the sound mind the quantity and quality of the volition depend upon the fulness of the reflection, and that any hindrance to the due association of ideas will *pro tanto* affect the will: if the particular volition were to be resolved by a retrograde metamorphosis into its component elements, there would be an explication or unfolding of all the ideas and desires which had gone to form it; and, going still further back in the analysis, there would be a revelation even of those particular relations in life which the individual's definite organization of ideas, the character of his *ego*, implies.

It will be proper, before finishing with the consideration of the will, to say something of the relations of the emotions to it. Independently reacting, as an emotional idea tends to do, it so far weakens the will; duly controlled and co-ordinated, as is the case after a just mental cultivation, it strengthens the will. Before many ideas have been acquired, and their multitudinous associations fixed, as in the young child; or where the state of the development of the brain precludes intellectual development, as in the idiot and in the animal,—the emotions excited immediately expend their energy in outward manifestation; and when in the cultivated adult there exists, from some cause, an unstable condition of nervous element, or when the tension of the emotion or passion is exceedingly great, it will also react directly outward in spite of the will: the law, admitting this, would count it therefore no great crime for a husband to have slain a man whom he had surprised in the act of adultery with his wife. But whosoever takes careful note of his own mental states may call to mind occasions on which an emotion suddenly excited strongly prompted a particular action, which he nevertheless withstood for an instant, and might, if necessary, have restrained altogether; but perceiving, with quick intuition, that he might do well to manifest the emotion, he afterwards allowed the action to take place. The looker-on, perhaps, sees only an impulse and rashness; and yet the rashness was in some sort deliberate—an indiscretion which served the end when wiser plots might have failed. Emotion was the real motive force, but an emotion acting under the direction of reason, and, therefore, in accordance with prudent insight into the external relations. The individual might have done the same action in obedience to a calm resolution of the will, and better so, perhaps, if he had been operating upon inanimate objects; but in dealing with men it may sometimes be that a prudent exhibition of feeling much aids the success of the ends designed. Only let a man beware that, however he imposes upon others, he does not deceive himself by his passion, allowing it to obscure his reason and pervert his judgment: restrained within the supreme centres, it is apt to do that in all minds, and sure to do so in weak minds; but, duly subordinated and co-ordinated in reflection, it adds force to resolution. Restrained passion, acting under the calm control of reason, is verily a most potent force; it gives a white heat, as it were, to the expression of thought, an intensity to the will.

An emotional person certainly often produces great effects in the world, and especially such effects as are destructive of some existing system or belief; it is, indeed, their great self-feeling commonly that gives to the reformers their abandonment, energy, and consequent success. But an evil, often outweighing these advantages, is that there is no guarantee that they are right; for, necessarily one-sided, they see but a part of a truth. It is certain that a great principle has often suffered seriously from the hasty, violent, and ill-considered action of its sincere and earnest advocates: adverse events or circumstances, which they in their passion could not recognise, but which, as rational beings, it behoved them to have recognised, have swept them away, and the truth which they have been upholding has been for a while the victim of their indiscretion. As in the mental phenomena of the individual the power of reflection is often best exhibited in the prevention of action prompted by feeling—in an inhibitory function, so amongst men in the social state the power of a good understanding is sometimes best manifest in not pressing an immature reform. But it is a very hard matter for a reformer who feels strongly to perceive that what is theoretically desirable and right may also practically be undesirable and wrong under existing social conditions; he is apt to treat adverse circumstances as if they were accidents or anomalies in nature, having no right of existence, and thus more or less wilfully shuts his eyes to the force of events on which he proposes to operate, and which will, in any case, operate upon his principle. He hurls a favourite principle, which may be a very just one, into the world not sufficiently prepared for it, which has not reached the due level of its evolution, and which, therefore, is necessarily hostile to it; and if his truth is oppressed and seemingly extinguished by the opposition which it meets with, then he is disheartened and complains, or is angry and rails: he is like the boy sending his paper boat on the lake whose waters are lashed by a storm. However, it is not nature which is wrong, if there is any wrong, but himself—the reformer. The fact that he did not succeed proves that he did not deserve to succeed; he has not rightly estimated the character and force of circumstances which have been too strong for his truth, and by a simple law of nature have, for a time at least, quenched its light. A great advance can never be superimposed upon a people miraculously; in order to be permanent it must be a natural evolution from pre-existing events—must grow out of them; that which most effectually demolishes an old error is not a passionate attack upon it by the intensely feeling reformer, but a new and better creation, which quietly undermines it so that it falls without trouble. Creation is a far higher order of work than destruction; it is the quiet, self-contained activity of definite productive aim—in other words, of will in its highest development—as opposed to the explosive and dissipated display of an inferior and mostly destructive emotional force. But as the calm intellectual contemplation of events, viewing all the relations of them, is attended with no great spur to any particular activity, but marks an equilibration between the individual and his environment, we may easily understand how excellent a thing to put the will in motion is some feeling or desire of good to be attained, or of ill to be shunned, in order to establish an equilibration. Then the will, enlightened by an inadequate reflection upon all the co-operating conditions, is able to act with a calm, steady, intelligent, and most potent energy.

Without doubt the will is the highest force in nature, the last consummate blossom of all her marvellous efforts. The natural product of the highest and completest reflection, it represents the exquisitely and subtly adapted reaction of man to the best insight into the relations in which he moves. If we reflect upon the manner in which the actions of the different nervous centres of the body are subordinated and co-ordinated in its manifestation,—how there are, as it were, a gathering together and concentration of different forces into *one* definite mode of action, a unifying of their energies,—we may be able to form a conception, by help of what we can thus observe, of the mode of that exaltation or transpeciation of force and matter throughout nature which we cannot follow through its inmost processes.*

By the power of a well-fashioned will man reacts with intelligent success upon the external world, brings himself into a complete harmony with his surroundings, assimilates and incorporates nature, and thus carries forward its organic evolution. The highest action of the will is therefore truly *creative*, for in it is initiated a new development of nature: it adumbrates the possibilities of mankind, as a rudimentary organ in a lower species of animal obscurely foretells the higher species in which it will have full development. If we ask whence comes the impulse that displays itself in this upward *nisus*, we can only answer lamely that it comes from the same unfathomable source as the impulse that inspires or moves organic growth throughout nature.

NOTES.

[1] (*p.* 147).—"Sixthly, the will appears to be nothing but a desire or aversion sufficiently strong to produce an action that is not automatic primarily or secondarily. At least it appears to me that the substitution of these words for the word *will* may be justified by the common use of language. The will is, therefore, that desire or aversion which is strongest for the present time. Since, therefore, all love and hatred, all desire and aversion, are factitious and generated by association, *i.e.* mechanically, it follows that the will is mechanical also."—Hartley's *Theory of the Human Mind*, p. 205.

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* *Transpeciation* is a word used by Sir Thomas Brown which might be found useful at the present day.

"Appetite, therefore, and aversion, are simply so called as long as they follow not deliberation. But if deliberation have gone before, then the last act of it, if it be appetite, is called *will;* if aversion, *unwillingness* . . . . . . Neither is the freedom of willing or not willing greater in man than in other living creatures. For where there is appetite the entire cause of appetite hath preceded; and, consequently, the act of appetite could not choose but follow: that is, hath of necessity followed. And, therefore, such a liberty as is free from necessity is not to be found either in the will of men or of beasts. But if by liberty we understand the faculty or power, not of willing, but of doing what they will, then certainly that liberty is to be allowed to both, and both may equally have it, whensoever it is to be had."—*Hobbes*, vol. i. p. 409.

"The whole sum of desires, aversions, hopes, and fears, continued till the thing be either done or thought impossible, is that we call *Deliberation.*"—*Leviathan*, vii.

[2] (*p.* 153).—I extract the following remarks of Hume:—

1. "But do we pretend to be acquainted with the nature of the human soul, and the nature of the idea, or the aptitude of one to produce the other? . . . . We only feel the event, namely, the existence of an idea, consequent to a command of the will. But the manner in which this operation is performed, the power by which it is produced, is entirely beyond our comprehension."

2. "The command of the mind over itself is limited as well as its command over the body; and these limits are not known by reason. . . . . . Will any one pretend to assign the ultimate reason of these boundaries, or show why the power is deficient in one case, not in another?"

3. "Self-command is very different at different times. . . . . Can we give any reason for these variations, except experience? Is there not here, either in a spiritual or material substance, or both, some secret mechanism or structure of parts, upon which the effect depends, and which, being entirely unknown to us, renders the power or energy of the will equally unknown and incomprehensible?"

4. "The motion of our body follows upon the command of our will. Of this we are every moment conscious. But the means by which this is effected, the energy by which the will performs so extraordinary an operation; of this we are so far from being immediately conscious, that it must for ever escape our most diligent inquiry."

After explaining that volition does not act directly on a limb itself, but through certain muscles and nerves, through which the motion is successively propagated, he asks—"Can there be a more certain proof that the power by which this whole operation is performed, so far from being directly and fully known by an inward sentiment or consciousness, is to the last degree mysterious and unintelligible. Here the mind wills a certain event; immediately another event unknown to ourselves, and totally different from the intended, is produced. This event produces another equally unknown; till, at last, through a long succession, the desired event is produced."—*Inquiry concerning the Human Understanding.*

CHAPTER VIII.

MOTOR NERVOUS CENTRES OR MOTORIUM COMMUNE, AND ACTUATION OR EFFECTION.

THUS far we have been engaged in considering the formation of the so-called mental faculties by the organization of residua, as this takes place in the production of simple or presentative ideas out of sensory impressions, that is, in apprehension; in the production of representative ideas or conceptions by abstraction from the simple ideas, that is, in comprehension; and in the production of volition as the result of the complex interworking of conceptions. But it is not man's function in life merely to think; his inner life he must express or utter in action of some kind. Consequently there are other residua besides those already dealt with, which enter as constituents into his mental life—the residua, namely, that are left behind by movements or actions. The movements that are instigated or actuated by a particular nervous centre do, like the idea, leave behind their residua, which, after several repetitions, become so completely organized into the nature of the nervous centre that the movements may henceforth be automatic. There is then, intervening between the volitional impulse and the action, a department or repository of motor residua, in which exist the immediate agents of movements—a region, psychologically speaking, of abstract, latent, or potential movements. If recourse be had to physiology, it is found that, conformably with what psychological analysis teaches, there are numerous special motorial nervous centres, or nuclei of ganglionic cells, from which motor nerves proceed, and by the experimental irritation of which movements may be artificially excited.

This region of motor residua, or, if we might venture so to call it, this *motorium commune*, is related to conception on the reactive side of human life, as sensation is on the receptive side. As the residua of sensorial activity are, as already seen, necessary to a definite representative conception, so do the residua of motorial activity in their turn enter into conception, and are indispensable to its realization in action. It may not be amiss, then, to take notice here, again, how the highest mental action comprehends or contains the whole bodily life. The sensory life enters essentially into conception; the organic life, as previously set forth, participates in the emotional quality of it; and the motorial activity of the body is essential to its due effectuation. How mischievously unjust, then, is the absolute barrier set up between mind and body! How misleading the parcelling out of the mind into separate faculties that answer to nothing in nature!

What name may most properly be given to this neglected but important motorial region of our mental life? The motor residua that mingle in our conceptions have been called, in Germany, *motor intuitions* (Bewegungs-anschauungen); but this description, though admirably expressing their intervention in conception, is perhaps too psychological to convey adequately an idea of their physiological importance as the immediate agents or faculties of all movements. The motor intuition, furthermore, intervenes not only between conception and respondent action, but also between sensation and the motor reaction thereto, and even between the stimulus and the resultant reflex action; so that the term intuition is not altogether suitable, and may perhaps produce confusion. More appropriately might this region of motor residua be described generically as the region of *actuation*, containing the powers or faculties through which the nervous centres, excited into activity, act upon the muscular system, and, by thus uttering or expressing their energies, restore the equilibrium. It contains the means by which will, idea, or sensation actuates definite movements, or prevents their occurrence. To describe it as the *locomotive faculty* would bring us to the inconsistency of calling that locomotive the aim of which was often inhibitory or preventive of motion, and would scarcely include the organic reflex movements.

However it be named, there can be no doubt that such a region of mental activity exists, and that in it are contained, predetermined and co-ordinated, the faculties of different groups and series of movements. It is evident, then, why the will can only determine the *result*,—cannot determine the action of a particular muscle, or the combined actions of certain muscles which have not acted together before. All it can do is to will the event, and thereupon the proper nerve-fibres and muscles are put in action through the medium of the motor intuition. If the result wished is a new, unfamiliar one, no residue thereof from previous experiences existing in the motor centres, then the will is unequal to the accomplishment of it; there is not an exact and definite idea of the end to be effected, the necessary motor intuition being wanting. After repeated trials, the desired skill is firmly acquired, and the movement is henceforth automatic, the motor intuition having been gradually organized in the proper nervous centres: the result strictly corresponds with that which in other nervous centres we describe as *abstract* idea. Here again we are taught that the design manifest in any act of will is due to similar organic processes to those which build up the design in the nervous centres of sensori-motor action and of reflex action, and may perceive that it is only because of its being attended with consciousness that we describe the energy of one of these definitely organized residua in the highest centre as a conception or notion of the result—speaking psychologically rather than physiologically.

In the animals the motor intuitions are, like their other faculties, mostly innate. There are no distinct, clear conceptions accompanying their instinctive actions; but obscure sensations and feelings excite the motor intuitions, which then determine the action of the proper muscles. In man, on the other hand, although the faculties of certain co-ordinate movements do exist, preformed in the nervous centres, the motor intuitions are mostly acquired; in this regard corresponding with the formation of his other mental faculties. Our ideas of distance, size, and solidity furnish striking examples of the manner in which we are indebted to our muscular intuitions, and of the difference in respect of them between us and the animals. The young swallow's intuition of distance appears to be as perfect when it begins to fly as it is after a life-experience; but it is not so with the young child, which cannot for some time tell how far off or how near an object is to it. In the first instance, the child's body moves with the eyes, when these are fixed upon a light that is moved about. After a few weeks the moving light is followed by a motion of the head only; next the eye-ball itself is turned also; and ultimately objects are followed with the eye without any motion of the head. As this is going on, there is acquired gradually a recognition of the distance of an object, and the convergence of the axes of the eyes is seen to change regularly and quickly with the distance of the object. Now it is well known that the accommodation of the eyes to distance takes place through a convergence of their axes and an accommodation of their lenses, two actions which are from the first very firmly associated; so much so that a congenital defect in the lense is now recognised to be the frequent cause of squinting in children. But these accommodating movements are not determined by any act of will, nor are they within consciousness; they are consensual movements in respondence to the visual sensation, and strictly comparable with the instinctive movements of the animals. It is not the visual sensation directly which gives us the idea or intuition of distance, but the motor intuition of the accommodating movement which, though uncertain and confused at first in man, soon gets precision and distinctness.(1) In this example we have a type of that which happens, with greater or less rapidity, in the case of every movement in the body. The infant at first kicks out his leg—whether from a so-called spontaneous outburst of energy, or by reason of some organic or external stimulus, matters not—and bringing it in contact with some external object, gets thereby a sensation, in respondence to which, as in the consensual accommodation of the eyes, adaptations of movements take place, and muscular intuitions are more or less quickly and completely organized. The residua of the muscular movements, or the muscular intuitions, are henceforth essential constituents of our mental life, whether we are distinctly conscious of them or not. Consider, if further illustration be needed, the gradual acquisition of the complex movements of speech, and the intimate connexion which they have with the formation of our conceptions. A weak-minded person, or a person of low cultivation, often cannot content himself with the mental representation of a word, or clearly comprehend a question put to him, but must bring the actual movement to his assistance, and utter the word or repeat the question aloud, in order to get his conception; and the essential importance of the articulating movements in conceptions is attested by the frequent deficiency of them in idiots. It is most necessary, however, to guard against the strong inclination which there certainly is to look upon certain movements, those of the eye and the tongue, as having a specially intimate connexion with the mental life which other movements of the body have not. Unwarrantably separating by an absolute barrier the mind from the body, and then locating it in a particular corner of the latter, as is commonly done, we are prone to forget that in mental action the whole bodily life is comprehended—that every muscular intuition, therefore, has its due place and influence in our mental life.(²)

Another consideration which it is necessary to bear well in mind is, that there is no fundamental difference in organic nature between those motor intuitions that are original, or primarily automatic, and those which are acquired in the natural order of development, or are secondarily automatic. Between the stimulus and the definite reflex action, whether innate or acquired, between the sensation and its assemblage or succession of muscular movements, the definite motor intuitions intervene as necessarily as between the conscious conception and the answering movement; though in the latter case only have we the consciousness of effort or motive energy. That the former may take place without consciousness, proves that the motor residua have been definitely and adequately organized in the proper motor centres; so that so far from design implying consciousness, as metaphysical psychologists have thought, consciousness altogether vanishes when the design is firmly fixed in the nature of the nervous element. Consider only the manifold co-existent and successive movements of the many muscles of the tongue, the palate, the pharynx, and the jaws, in mastication and deglutition—complex movements which the will could never effect, of which we have little or no consciousness, and before which human ingenuity is mute—and it will be abundantly evident how much we depend in our active life upon the region of motor intuitions. But let it not be overlooked, let it, indeed, be prominently held in remembrance, that these external motor manifestations only represent what is contained internally in the appropriate nervous centres; that what is outwardly displayed exists in the innermost; that every motor intuition is, consciously or unconsciously, an essential part of the mental life.

The foregoing observations are greatly strengthened by certain morbid phenomena, in which a variation of the circumstances furnishes an excellent test of the principles enunciated. In the course of his investigations into what he called "hypnotism," Mr. Braid found that if the face or limbs of his patients were placed in an attitude which was the normal expression of a certain emotion, thereupon that emotion was actually excited; the motor intuition immediately awakening the appropriate conception. This is in accordance with what we frequently observe in watching the genesis of mind in young children, where it is plain that an attitude or gesture, unconsciously or involuntarily produced, sometimes awakens in the mind the correlative idea or emotion, and where, on the other hand, every thought is immediately translated into some movement.

But the influence of the motor department of mental action, the region of actuation, will receive far stronger illustration from the phenomena of insanity and of certain convulsive diseases. It scarcely admits of question that some of the delusions of the insane have their origin in what may justly be called muscular hallucinations: a disorder of the nervous centres of the muscular intuitions generates in consciousness a false conception, or delusion, as to the condition of the muscles, so that an individual lying in his bed believes himself to be flying through the air, or imagines his legs, arms, or head to be separated from his body, just as he gets hallucinations of sense when the sensorial centres are disordered.(3) In dreams we may sometimes observe the same kind of thing, as when from hindered respiratory movements a person suddenly wakes up with the idea that he is falling over a precipice. Such muscular illusions, or hallucinations, can of course only ensue when the reaction of the disordered motor intuition is into consciousness; if, as may happen, and commonly does happen, the reaction takes place outwards, there are irregular or convulsive movements, but no delusion is generated.

The phenomena of convulsions, properly examined, will serve to exhibit the independent nature of the motor intuitions. Every kind of movement which may be normally excited by the will may occur as a convulsive act, when, of course, there is no question of the exercise of will, and when there is often an entire absence of consciousness.(4) As the individual in sound health must give intense attention in order to isolate a certain muscular movement which usually takes place as a part of a complex series, and then cannot always succeed, it is not surprising that in spasmodic or convulsive muscular action there should often be more or less co-ordination of movements; the design in the centres of motor intuitions not being entirely abolished. In cases of cerebral hæmorrhage, it sometimes happens that the articulating movements of single sounds, or of a certain series of sounds, syllables, or words, are produced without any mental act, or even against the will, of the patient. Consciousness is not always entirely abolished; and then patients are able to give an account of the impulse which instigates the movements, and which they are unable successfully to resist. It is well known that the idea of convulsions, whether excited by present perception or by memory, may express itself in convulsive movements—movements that, nevertheless, often display a considerable amount of co-ordination. It is evident enough how, in a healthy person, swallowing, coughing, and yawning are excited by the observation of these acts in another; and as instances of similarly produced morbid actions, Romberg adduces those dancing epidemics of the Middle Ages, in which co-ordinate spasmodic movements were notoriously excited in delicate women to an extent and for a period such as the strongest man could not have endured in health. It behoves us to keep in mind that as so many of our co-ordinate actions are automatically done in health, so there may be considerable co-ordinate automatic action in disease.

There yet remains further important considerations. Let a man have the will to command or effect a certain movement, and a notion of the result desired, without any paralysis of motor power, and he may still be impotent to perform the movement. And why? Because there may be a paralysis of sensibility in the muscles, by reason of which he has no means of knowing what is the condition of the muscles of the part, the instruments which he is to use—cannot tell whether they are acting or not; he lacks that information which the muscular sense should rightly afford him. In order that the will may actuate a movement, there are necessary, then, not only a conception of the end desired, and a motor intuition of the muscular movements subserving that end, but also a sense of the action of the muscles. Any psychological arguments as to the value of this guiding muscular feeling are rendered needless by pathological experience, which plainly proves that, when the muscular sense is paralysed, the movements cannot be performed except some other sense come to the rescue. The sense of sight usually does this: a woman, whom Sir Charles Bell saw, who had lost the muscular sense in her arm, could nevertheless hold her child when she kept her eyes upon it; but the moment she turned her eyes away she dropped the child. I have seen a similar instance recently of a woman, epileptic in consequence of syphilis, who had lost the muscular sense in her left arm, and who did not know, except she looked at the limb, whether she had got hold of anything with her hand or not; if she grasped a jug, she could hold it quite well as long as she looked at it, but if she looked away then she dropped it: she had no loss of tactile sensation. In such morbid states the difference between tactile sensation and the muscular sense is well marked. "Ollivier details a case in which the patient had lost the cutaneous sense of touch throughout the side in consequence of concussion; at the same time he was able to form a correct estimate of the weight of bodies with his right hand. The physician observed by Marcet, who was affected with anæsthesia cutanea of the right side, was perfectly able to feel his patient's pulse with the fingers of the right hand and to determine its frequency and force, but in order to determine the temperature of the skin he was obliged to call in the aid of his left hand." Anæsthesia of the muscle, without loss of tactile power, does, according to Romberg, invariably accompany the disease called tabes dorsalis.*

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* It must be remembered that simple loss of muscular feeling is not Tabes Dorsalis; in this disease, the characteristic phenomenon is a loss of the power of co-ordination of the muscles, and the morbid appearances are those of degeneration of the posterior columns of the spinal cord—the motor repository or centres of

The eyes of patients so affected are their regulators or feelers, and consequently their helplessness when their eyes are shut or they are in the dark is extreme; if told to shut their eyes while in the erect posture, they begin to oscillate until they fall down, unless supported. The skin remains sensitive except during the last stage of the disease.

Romberg, Duchenne, and others have, moreover, described similar morbid conditions in anæmic and hysterical women, but which can hardly be called paralysis, as they are manifest only in the night or when the eyes are shut: the patients can perform movements, but these do not answer accurately to the will; they are deceived as to the amount of force necessary to be put forth, and sometimes cannot undertake the movement of a limb without the help of sight. In these cases there is the desire to effect a certain action, there is the motor intuition of the movement necessary to the end desired, but there is wanting the guiding sensation of the muscular sense; and accordingly the action cannot be done unless the sense of sight takes upon it the function of the defective muscular sense.

What relation has the muscular sense to the motor intuition? It is not an easy question to answer either from a psychological or from a physiological basis. The relation appears to be not unlike that which the sensation of a special sense has to the corresponding idea: as the sensation of the special sense is necessary to the formation of the idea, but, this once formed, not necessary to its existence or function, so the muscular feeling would seem to be an essential prerequisite to the formation of the motor intuition, but, this once formed, not necessary to its latent existence, or, indeed, to its active function, provided only another sense furnish the guiding information. Like other senses the muscular sense is receptive; it ministers to the building up of the fundamental ideas of solidity, size, figure, and distance, through an internal adaptation to external nature; and in the outward intelligent reaction of the individual, by virtue of these

co-ordination of the movements of the limbs. Hence the disease is now more properly called Progressive Locomotor Ataxy. Loss of muscular feeling is a symptom that may occur in different diseases; if another sense takes its place, movements are still effected; so that the power of movement, the repository of motor residua, is not affected.

ideas, upon external nature it furnishes the guiding feeling by which he is enabled to direct the action and to regulate the amount of force applied in any given case. How admirably graduated is the application of force by the hand in delicate handicraft operations! How clumsy and incapable is the beginner in such crafts until by frequent practice the requisite motor intuitions have been acquired! Consider how awkward any one is at so simple a matter as winding up a watch even for the first time; and how quick, easy, and certain the operation afterwards becomes. Observations made upon persons born blind prove that there is nothing essential to the highest intellectual processes that may not be acquired in the absence of sight, mainly through the muscular feeling in combination with touch.

Because the muscular feelings gradually build up the motor intuitions in accordance with the order, synchronous or successive, of our experience, it is not difficult to deceive them by a new experience modifying or reversing that order. It is well known that if the middle finger be crossed over the fore-finger and a pea or a like round body be put between them, while the eyes are turned away, there will be the sensations of two bodies; the impression on that side of the fore-finger which is habitually associated in action with the thumb excites independently its residua, and that side of the middle finger which is accustomed to act with the third finger excites also its residua; and the consequence is a feeling of two bodies which it requires the evidence of another sense to correct. So closely, however, are our different senses associated in their functions, that they may instead of, as is their proper function, aiding and correcting one another, sometimes even help to deceive one another. When the metal potassium was first shown to an eminent philosopher, he exclaimed, on taking it into his hand, "Bless me, how heavy it is!" and yet potassium is so light as to float on water. The metallic appearance had suggested a certain resistance, or the putting forth of so much muscular energy as previous experience of substances having a similar look had proved necessary; and for a moment the suggestion of the visual sense overswayed the actual experience of the muscular sense: the muscular sense was deceived as the man is who concludes that a certain co-existence or succession in nature must always exist because he has observed it in a great many instances; or as, at the disinterment of a body suspected to have been murdered, one of the spectators, who fainted on account of the bad smell, was deceived; for when the coffin was opened it was found to be empty.

The perfect function of the muscular sense is not only of essential importance to the expression of our active life, but, like the function of any one of the special senses, it has its due part in our mental life. In the general paralysis of the insane there are two prominent characteristics: the first is the general paralysis in greater or less degree of the muscles of the body; and the second is the extraordinary delusions of grandeur. It is a question well worth consideration, whether these characteristic symptoms do not stand in some degree of causal connexion to one another. A tailor who is suffering from general paralysis will promise to make you a magnificent waistcoat, and, if the materials are supplied to him, will at once set to work. It is not improbable that, deceived by his quiet assurance, and knowing that to sew is his business, you believe that he may make the waistcoat. But in a little while you will find that his stitches are most unequal in size, and are placed in the most disorderly way; and it is made clear that, whatever he himself may think, he certainly cannot sew. He has a sufficient desire to accomplish the result, an adequate general notion of the end desired, a full belief in his ability to effect it; but he fails because his muscular feeling is very deficient, and because he cannot regulate the action of the necessary muscles. That is not all, however: as the sleeper, whose external senses are so closed as to shut out the controlling influence of external objects, often does in his dreams the most wonderful things, and finds little or no hindrance to an almost miraculous activity, intellectual or bodily; so the general paralytic, whose defective muscular feeling cuts him off from the due appreciation of external relations, has engendered in his mind the most extravagant notions as to his personal power; he dreams with his eyes open. As it is to the muscular sense that we owe the development of our fundamental ideas of resistance, form, size, and space, it may easily be understood that, when it is deficient throughout the body, as in the general paralytic, there should not be that intelligent accord between the inner life and the outward relations which, when in a perfect state, it maintains. Here, again, we perceive how impossible it is to separate the mental from the bodily life; how plainly, when we scan the deeper relations of things in their genesis, there are displayed the closest connexion and continuity of parts and functions.

To the action of the will, as already pointed out, a conception of the result is essential, whether the volitional exertion be for the purpose of causing a movement, of preventing or checking a movement, or of dismissing a painful idea from the mind. When a sensation excites a co-ordinate movement in so-called sensori-motor action, we do not say there is a conception of the result, because of the absence of consciousness; but at the same time we must admit that there is a motor intuition of the result,—in other words, that there is a definitely organized residuum in the proper motor nervous centre, which, as it were, implicitly contains the movement. Now it is important to bear in mind that, when the will excites that co-ordinate movement which a sensation alone may do, as not unfrequently happens, the will cannot operate directly on the motor nerves, but must necessarily operate through the medium of the same motor intuition as that through which the sensation acts: in other words, the movement in both cases proceeds directly from the motor nervous centre in which the movement is latent. If we could excite these centres artificially, not over-exciting and injuring them as in our gross experiments we necessarily do, then we should not fail to set free the definite movements. Speaking psychologically, the conception of the result becomes, in the execution of voluntary movements, the motor intuition, and the motor intuition excited into activity expresses itself in the designed movement. Thus, then, it appears that as in the action of nature upon man the stimulus which is not reflected in the spinal cord passes upwards and excites sensation, and the stimulus which is not reflected in sensori-motor action passes upwards and becomes idea, and the stimulus which is not reflected in ideomotor action passes from cell to cell in the hemispheres and excites reflection; so in the reaction of man upon nature, the force of the will passes downwards through the subordinate centres in an opposite direction: the will involves a conception of the result or a definite ideational action; the conception of the result demands for its further transformation the appropriate motor intuition; and the motor intuition, in whatever motor centre, spinal or cerebral, it is organized, demands for its due expression in movement the perfect function of the muscular feeling, and the integrity of the motor nerves and muscles. There is an orderly subordination of the different nervous centres, a chain of means such as is revealed in every department of nature. Viewing the different sciences, we perceive that chemistry is dependent on physics, while physics are independent of chemistry; physiology is dependent on chemistry, while chemistry is independent of physiology; social science is dependent on physiology, while physiology is independent of social science: and so the just analysis of our mental life proves that sensori-motor action is dependent on reflex action, while reflex action is independent of sensori-motor action; ideomotor action dependent on sensori-motor action, while sensorimotor action is independent of ideomotor action; the will dependent on ideomotor action, while ideomotor action is independent of the will. These different epochs in the order of development of the nervous system are represented by different classes of the lower animals: and it is interesting to note that, as in man there is a subordination of parts, and the will, as the highest energy, controls the inferior modes of nervous energy, so in the animal kingdom there is a subordination of kinds, and the mind of man, as the highest development, controls and uses many of the lower animals.

If execution has been in any wise answerable to conception, we have now said enough to prove the importance of that region of mental activity in which dwell the motor residua, and which may properly be named the region of actuation. We have only to add that men differ much naturally as to the perfection of this as of other mental faculties. There are some who, with great intellectual power, never can attain to the ability of successfully expressing themselves: and there are others, on the other hand, who can pour forth endless talk with the most facile fluency. The *art of expression* in speech, or in writing, or even in eloquence of action, is one which, if there is not an innate faculty for it, can never be acquired in its highest perfection:

unseen fetters hinder the full utterance, and lame execution falls far short of ambitious conception: with the distinct conception of what they would say, and the best will to say it, there is something wanting in the region of actuation, whereby they are prevented from doing justice to their thoughts, and are compelled, like Moses, to delegate that function to others. "There is Aaron: he shall be thy speaker, and thou shalt be to him instead of God" (Exodus iv. 16).*

NOTES.

[1] (*p.* 170).—"The sensation of muscular action is of the greater consequence," says Romberg, "with regard to the function of sight. The perception of the movement of visual objects depends as well upon the progress of the image upon the retina as upon the sensations of the muscles of the eye being reduced to consciousness; the fatigue of these muscles operates injuriously upon the power of vision, and appears to be the cause of the painful affection to which hitherto the term *hebetudo visûs* has been applied. The affected eye at first sees equally well with the healthy eye, in close proximity, and at a distance, and is equally able to distinguish clearly the most minute objects; but the power of endurance in the exercise of this function soon ceases; almost with every movement the patient loses this facility of accurately discriminating. Objects placed at a small distance apparently become confused, and a rapidly increasing, and at last insupportable, sense of weight, tension, and fatigue, in the orbital and frontal regions, force the patient entirely to desist from continued exercise of his eyes; if he perseveres, headache and giddiness supervene."—*Diseases of the Nervous System,* vol. i. p. 92. The condition is doubtless attributable to the weariness of the muscles and their nerves; they are too weak to accommodate themselves.

[2] (*p.* 171).—Though it is proved by examples of deaf and dumb people, notably by the example of Laura Bridgman, who was deaf, dumb, and blind, that a person may have human thought without being able to speak, yet it is by no means proved that it is possible to think without any means of physical expression. On the contrary, the evidence is all the other way. Laura Bridgman's fingers worked, making the

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* And a greater than Moses or Aaron was so gifted with the faculty of excellent expression, that it was justly said of Him that "Never man spake as this man speaks."

initial movements for letters of the finger alphabet, not only during her waking thoughts, but even in her dreams. Heyse, in his *System der Sprachwissenschaft*, Berlin, 1856, says, p. 39 :—"Herein lies the necessity of utterance, the representation of thought. Thought is not even present to the thinker, till he has set it forth out of himself. Man, as an individual endowed with sense and mind, first attains to thought, and, at the same time, to comprehension of himself, in setting forth out of himself the contents of his mind, and in this his free production he comes to the knowledge of himself, his thinking 'I.' He comes first to himself in uttering himself." On this question there are some excellent remarks in the *Early History of Mankind*, by E. B. Tylor, 1865.

[3] (*p.* 172).—"I had some years since," Dr. Whytt writes, "a patient affected with an erysipelas in his face, who, when awake, was free from any confusion in his ideas ; but no sooner did he shut his eyes, although not asleep, than his imagination began to be greatly disturbed. He thought himself carried swiftly through the air to distant regions ; and sometimes imagined his head, arms, and legs to be separated from his body, and to fly off different ways."—*Obs. on Nature, Causes, and Cure of Nervous Hypochondriacal, or Hysteric Disorders*, 1765.

Illusory movements or *illusory positions* are the characteristic traits of vertigo ; other subjective sensations, such as noises in the ears, coruscations before the eyes, painful sensations in the head, often being associated with them. In dreams, and also in drunkenness, there is no possibility of correcting these subjective muscular symptoms at the time ; and the brain, the organ of the mind, renders them conscious, and thus converts them into erroneous conceptions of space.

[4] (*p.* 173).—Romberg gives a remarkable case of what he calls rotatory spasm in a girl of ten years of age. Also, "Co-ordinated spasm occasionally enters into a combination with chorea; of this I have met with an instance in a boy *æt.* six, who was occasionally attacked with an irresistible desire to climb in spite of every impediment ; in the intervals he was affected with chorea."—Vol. ii. p. 169. Consciousness may or may not be quite abolished. In certain cases of cerebral hæmorrhage, syllables or words are uttered without any mental act on the part of the patient, or even against his will.

CHAPTER IX.

MEMORY AND IMAGINATION.

"You tell me it consists of images or pictures of things. Where is this extensive canvas hung up? or where are the numerous receptacles in which these are deposited? or to what else in the animal system have they any similitude? That pleasing picture of objects represented in miniature on the retina of the eye seems to have given rise to this illusive oratory. It was forgot that this representation belongs rather to the laws of light than to those of life; and may with equal elegance be seen in the camera obscura as in the eye; and that the picture vanishes for ever when the object is withdrawn."—DR. DARWIN, *Zoonomia.*

THOUGH Memory has not hitherto been specially treated of as a faculty of the mind, its true nature has been none the less discussed largely, though incidentally, in the foregoing pages. It may be desirable, however, to bring together into one body the fundamental facts concerning it. There is memory in every nervous cell, and, indeed, in every organic element of the body. The permanent effects of a particular virus on the constitution, as that of small-pox, or that of syphilis, prove that the organic element remembers for the rest of life certain modifications which it has suffered; the manner in which the scar on a child's finger grows as the body grows evinces, as Mr. Paget has pointed out, that the organic element of the part does not forget the impression that has been made upon it; and all that has so far been said respecting the different nervous centres of the body cannot fail to demonstrate the existence of memory in the nervous cells which lie scattered in the heart and in the intestinal walls, in those that are collected together in the spinal cord, in the cells of the sensory and the motor ganglia, and in the ideational cells of the cortical layers of the cerebral hemispheres. The residua by which our faculties, as already shown, are built up, are the organic conditions of memory. These organized residua of the cerebral centres, which, when excited into activity by some external impression, enable us to perceive distinctly, or apprehend the object, appear, when excited by some internal cause, as memory or recollection. When an organic registration has been completely effected, and the function of it has become automatic, we do not usually speak of the process as one of memory, because it is entirely unconscious. Thus, for example, when a beginner is learning his notes on the pianoforte, he has deliberately to call to mind each note; but when, by frequent practice, he has acquired complete skill in playing on that instrument, there is no conscious memory, but his movements are automatic, and so rapid as to surpass the rapidity of succession of conscious ideas. As with such movements, so it is with many ideas, which are so completely organized that they are automatically and quickly performed in our mental life without conscious memory.(1)

The organic registration of the results of impressions upon our nervous centres, by which the mental faculties are built up, and by which memory is rendered possible, is the fundamental process of the mental life. There can be no memory of what we have not had experience in whole or in parts; and nothing of which we have had experience can be absolutely forgotten. But it is most mischievous to regard mental phenomena as mere pictures of nature, and the mind as a vast canvas, on which they are cunningly painted. Such representation, as Darwin well observes, belongs rather *to the laws of light than to those of life;* the real process is one of organization, and is rightly conceivable only by the aid of ideas derived from the observation of organic development, namely, the fundamental ideas of Assimilation and Differentiation.

There is in mental development, then, the organic registration of the *simple* ideas of the different senses; there is the assimilation of the like in ideas which take place in the production or organic evolution of *general* ideas; there is the special organization, or differentiation, or discrimination, of unlike ideas; and there is the organic combination of the ideas derived from the different senses into one *complex* idea, with the further manifold combinations of complex ideas into what Hartley called *duplex* ideas. In fact, no limit is assignable to the complexity of combinations which may go to the formation of an idea. Take, for example, the idea of the universe. But how comes it to pass that a new creation of the mind, to which nothing in nature answers, is effected? By a similar organic process to that by which like residua are blended, and general or abstract ideas formed. There are no actual existences answering to our most abstract ideas, which are, therefore, so far new creations of the mind. In their formation there is a comparison of our ideas, and a blending or coalescence of their like relations takes place—the development of a *concept*. There is, as it were, an extraction of the essential out of the particular, a sublimation of the concrete; and, by the creation of a new world in which these essential ideas supersede the concrete ideas, the power of the mind is most largely extended. Although there is no concrete object in nature answering to these abstract ideas, yet they are none the less, when rightly formed, valid and real subjective existences that express the essential relations of things, as the flower which crowns development expresses the essential nature of the plant. Thus it is that we rise from the particular idea of a man to the general idea of man, and then again to the abstract idea of virtue; so that for the future we can make use of the abstract idea in all our reasoning, without being compelled to make continual reference to the concrete.* Herein, be it remembered again, we have a process corresponding with that which ministers to the production of our motor intuitions; the acquired faculty of certain co-ordinate movements through which complicated acts are automatically performed, and we are able to do, almost in the twinkling of an eye, what would cost hours of labour if we were compelled on each occasion to go deliberately through the process of special adaptation, is the equivalent, on the motor side, of the general idea by which so much time and labour are saved in reasoning: in both cases there is an internal development in accordance with fundamental laws, and the organized result is, as every new phase of development is, a new creation. Creation is not by fits and starts, but it is continuous in nature.

These considerations are of importance in respect of the nature of Imagination, which must ever be incomprehensible on the mischievous assumption of ideas as pictures or images of things painted on the mind. Though imagination is certainly dependent on memory, is it not, it may be asked, more than *reproductive*,—is it not, in fact, *productive?* *Productive*, we reply, as to *form*, but certainly only *reproductive* as to material. When any one affirms that he can imagine something—as, for example, some animal of which he has not had experience, what he does is to combine into one form certain selected characters of different animals of which he has had experience; creating in this way, as nature is continually doing, new forms out of old material. When the artist embodies in ideal form the result of his faithful observation, he has, by virtue of that mental process through which general ideas are formed, abstracted the essential from the concrete, and then by the shaping power of imagination given to it a new embodiment. In every great work of art there is thus an involution of the universal in the concrete. It is pregnant in its meaning, and yields a wide range to the activities of another's imagination when he contemplates it; and therefore it is that high art cannot express anything *essentially* evanescent: it confers on the moment the stedfastness of eternity, represents the "shows of nature frozen into a motionless immortality." The man of science, who unlocks the secrets of Nature by means of observation, experiment, and reflection, thus systematically training his mind in conformity with Nature by exact interrogation and faithful interpretation of her works, has recourse, when he proceeds to react upon nature, to a scientific imagination thus carefully cultivated, and is enabled to construct wonderful works of art that are truly an advance upon, or a development of, nature —new creations. What else then, fundamentally, is the true imagination but the *nisus* of nature's organic development displaying itself in man's highest function? What is human art but nature developed through man? There is going on a recreation of nature by human means, but nature makes the means.*

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* But it should not be forgotten, as it is so apt to be, that the meaning of the general or abstract is to be sought in the concrete, not the interpretation of the concrete in the general or abstract.

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* "Yet nature is made better by no mean,
But nature makes that mean; so, over that art,
Which, you say, adds to nature, is an art
That nature makes. . . . .
. . . .
. . . . This is an art
Which does mend nature—change it, rather: but
The art itself is nature."—*Winter's Tale.*

The productive or creative power of Imagination, which seems at first sight to be irreconcilable with knowledge gained entirely through experience, is then at bottom another, though the highest, manifestation of that force which impels organic development throughout nature; and the imagination of any one creates truly, or brings forth abortions and monstrosities, according as the mind is well stored with sound knowledge, and has true concepts, or as it is inadequately furnished with knowledge, or is furnished with erroneous concepts—according, in fact, as the individual is or is not in harmony with nature. As imagination is an example of organic evolution, so the well-grounded imagination of the philosopher or the poet is the highest display of nature's organic evolution.*(2)

How much of what we call memory is in reality imagination! When we think to recall the actual, the concrete, it is often the ideal, the general, that we produce; and when we believe that we are remembering, we are, influenced by the feelings of the moment, and not able to reproduce the feelings of the past, *mis*-remembering. The faculty by which we recall a scene of the past, and represent it vividly to the mind, is at bottom the same faculty as that by which we represent to the imagination a scene which we have not witnessed. "For *φαντάζεσθι* and *meminisse*, fancy and memory, differ only in this, that memory supposes the time past, which fancy doth not." How much of our perception even is *actually* imagination! The past perception unavoidably mingles in the present act, prevents us often from discriminating minute differences which exist, and thus causes us to perceive wrongly or observe incorrectly. What shall be admitted as a *fact* in scientific observation, depends entirely upon the observer's previous knowledge and training. So strong is the disposition to assimilate a present observation with a past perception, to blend together the like in two ideas, that we are apt to overlook those special differences which demand a discrimination or organic differentiation; there is, indeed, almost as great a danger of hasty generalization in perception as there is in reasoning. If a new observation will not easily assimilate with existing ideas, there is a feeling of dissatisfaction and positive discomfort, and one is apt to pass the unwelcome fact by. But if a proper mental training prevents such neglect, the fact is deliberately appropriated or registered as a special fact, although small satisfaction is felt in the martyrdom of thus registering it, isolated as it appears; after a while, however, other observations cluster about it, some blending with it, others connecting it with ideas to which it seemed entirely unrelated, until this pariah of the mind is found perhaps to fill up a gap in knowledge, and organically to unite distant ideas. It is a most necessary habit to acquire in the true cultivation of the mind, that of observing accurately, carefully noting minute differences, and of scrupulously registering them, so as to effect an exact internal correspondence with external specialities.

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* "All power is of one kind," says Emerson, "a sharing of the nature of the world. The mind that is parallel with the laws of nature will be in the current of events, and strong with their strength. One man is made of the same stuff of which events are made; is in sympathy with the course of things, can predict them."

As we perceive more accurately, so shall we remember more correctly, judge more soundly, and imagine more truly. The habit of hasty and inexact observation, the unwarranted blending of residua that are not truly like, is necessarily the foundation of a habit of remembering wrongly; and the habit of remembering wrongly is of necessity the cause of an incorrect judgment and erroneous imagination: exact internal correspondence to external relations being the basis of an imagination true to nature,—in other words, of a true organic mental development. For these reasons, "the whole powers of the soul may," as Hartley observes, "be referred to the memory, when taken in a large sense. Hence, though some persons may have strong memories with weak judgments, yet no man can have a strong judgment with a weak original power of retaining and remembering." Infinite mischief and confusion have been caused by the habit of speaking of ideas as if they were the mechanical stamps of impressions on the memory, instead of as, what they truly are, organic evolutions in respondence to definite stimuli; our mental life is not a copy but an idealization of nature, in accordance with fundamental laws.

As organic growth and development take place in obedience to the laws of nature, and yet constitute an advance upon them, so it is with the well-cultivated or truly developed imagination, which brings together images from different regions of nature, yokes them together by means of their occult but real relations, and, thus making the whole one image, gives a unity to variety: there is an obedient recognition of nature, and there is a developmental advance upon it. This *esemplastic* faculty, as Coleridge, following Schelling, named it, is indicated by the German word for imagination, namely, *Einbildung*, or the *one-making faculty*. Its highest working in our great poets and philosophers really affords us an example of creation going steadily on as a natural process; and creative or productive activity is assuredly the expression of the highest mental action: whosoever has such capacity has more or less genius; whosoever has it not will do nothing great, though he work never so hard. What an amount has been unwisely written by the sedulous followers of a so-called inductive philosophy in disparagement of imagination and in favour of simple observation! "Men should consider," says Bacon, "the story of the woman in Æsop, who expected that with a double measure of barley her hen would lay two eggs a day; whereas the hen grew fat and laid none." It were as wise in a man to load his stomach with stones instead of food as to load his mind with facts which he cannot digest and assimilate. It is in the great capacity which it has of assimilating material from every quarter, and of developing in proportion, that the superiority of genius consists; and it is in the excellence of its imagination, whether poetical, artistic, philosophic, or scientific, that its superior energy is exhibited.

Because the least things and the greatest in Nature are indissolubly bound together as equally essnetial parts of the mysterious but harmonious whole, therefore the intuition into one pure circle of her works by the high and subtle intellect of the genius contains implicitly much more than can be explicitly displayed in it. Hence it comes to pass at times that, in the investigation of a new order of events by such an intellect, the law of them will, as by a flash of intuition, explicitly declare itself in the mind after comparatively few observations: the imagination successfully anticipates the slow results of patient and systematic research, flooding the darkness with the light of a true interpretation, and thus illuminating the obscure relations and intricate connexions. Therein a well-endowed and well-cultivated mind manifests its unconscious harmony with nature.

The brightest flashes of genius come unconsciously and without effort: growth is not a voluntary act, although the gathering of food is.

Certainly the intuition of truth can never be the rule amongst men, inasmuch as the genius capable of intuition, so far from being common, is a most rare exception amongst them. And the result, however brilliantly acquired, can never be safely accepted as lasting until it has been further subjected to the tests of observation, experiment, and logical reasoning,—until it has undergone verification. The man of genius who has revealed a great truth may probably, on some other occasion, promulgate an equally great error. Happily his errors are indirectly most useful; for the experiments and observations provoked and directed by them, and prosecuted for the purpose of displaying their instability, often lead to valuable discoveries. Mischief is undoubtedly wrought by the rash promulgation of ill-grounded theories on the part of those who have neither superior original capacity, nor a mind well-stored with the results of observation, nor an imagination properly cultivated. It is the ignorant only, however, whom such persons deceive: those who possess an adequate knowledge of the subject can always recognise in the unwarranted theory the exact amount of knowledge which its authors have had, and the defective character of their minds. Those, again, who take a philosophical view of things, and look upon the progress of human knowledge as a development that is going on continuously through the ages, will find it conformable to their experience of every other form of vital growth that there should be, coincidently with advance, a retrograde metamorphosis, degeneration, or corruption of that which is not fitted for assimilation, and which is ultimately rejected: as the body dies daily as the condition of its life, so false theories and corrupt doctrines are conditions of the progress of knowledge. That there is a deep distrust of hasty generalization is a manifestation of the self-conservative instinct; it prevents the human mind from being led astray by vain and windy doctrines, and thus promotes a true development. It is not, however, in the individual, where so much active change takes place in so short a time, that the regular corruption and decay of false doctrines will be clearly perceived, but in the historical development of the race, where the gradual evolution of the mind may be better traced.

Thus much concerning memory and imagination, which, when properly examined, reveal, better perhaps than the analysis of any other of the so-called mental faculties, the complex organization which mind really is. It remains only to add here, that the manifold disorders to which memory is liable illustrate in the most complete manner its organic nature. Its disorders are numberless in degree and variety; for there is not only every degree of dulness, but there is met with every variety of partial loss, as of syllables in a particular word, of certain words, places, names. So various and numerous are they, that it has not yet been possible to reduce them to any system, although it is probable that a careful classification of them might be very useful. All that we can at present conclude from them is, first, that memory is an organized product; and, secondly, that it is an organization extending widely through the cortical layers of the cerebral hemispheres. It is interesting to observe that differences exist in different persons in the character of the organic function which ministers to memory: one man, for example, has a good memory for particular facts, but is no way remarkable for reasoning power, or is even singularly deficient therein—the registration of the concrete impressions taking place with the greatest ease, but the further digestion of the residua not being accomplished; another, on the other hand, has no memory for particular isolated facts—they must have some relation to ideas already appropriated, or must fall under some principle, if he is to recollect them; the digestion of residua is well effected, so that there exists a great power of generalization. The latter is the memory of intellect; the former is not unfrequently the memory of idiots.

Some flaw in the memory, some breach in its exquisite organization, is ever the first indication of a disorder or degeneration of nervous element. But its slight, early affections are very apt to be overlooked, forasmuch as they do not reveal themselves in a conscious inability to remember something, but in an unconscious deterioration of the power of abstract reasoning, and of the moral sense that is so closely connected therewith. The most delicately organized residua, representing the highest efforts of organic assimilation, are the first to attest by their sufferings any interference with the integrity of nervous element. Long before there is any palpable loss of memory in insanity, even before an individual is recognised to be becoming insane, there is a derangement of his highest reasoning and of his moral qualities; his character is more or less altered, and, as it is said, "he is not himself." If the degeneration of nervous element proceeds, we witness successively every stage of declension in the disorder of the complex organization of the memory; namely, manifest perversion of the higher feelings, greater or less destruction of the organic connexions of ideas, whence follow incoherence of thought and, finally, general forgetfulness, declining into complete abolition of memory.

It is not difficult to understand how it is that the old man sometimes has a tenacious memory of the past, and can reason tolerably correctly with regard to it, when he cannot duly appropriate and rightly estimate the present. The brain, like every other organ of the body, suffers a diminution of power of activity with the advance of age; it reacts to impressions with less and less vigour and vivacity, and there is less and less capacity to assimilate the influence of them, so that there is a dulness of perception and an incorrect appreciation of events. Meanwhile, however, the past is a part of the organic nature of the brain, and may be sufficiently remembered, though perhaps with less vivacity than formerly. It is easy, again to perceive how it is that children, like animals, live almost entirely in the present; they have no store of ideas organized in the mind which might be called into activity to influence the present idea, and they react directly to the impressions made upon them. The best possible evidence of the gradual process of mental organization is indeed afforded by the mental phenomena of young children; for the residua of impressions not being completely organized, their memory is fallacious, and, a firm organic association between ideas not being established, their discourse is incoherent. The old man and the child both fail in judgment: the former, because he has forgotten more or less of the past, and has lost the standard by which to measure the present perception, or because he cannot take in the present perception and measures it entirely by the past; the latter, because it has not yet any past.

Lastly, it will not be amiss to bear in mind, in regard to the organic nature of memory, that we cannot remember pain. It is certainly possible to remember that we have suffered a particular pain; but vividly to recall the pain as we can a definite idea is not possible. And why? Because the idea is an organized product which abides, while the disorganization or disturbance of nervous element which pain implies passes away with the restoration of the integrity of the nervous centre. For the same reason, we cannot easily or adequately recall a very powerful emotion in which the idea or the *form* has been almost entirely lost in the commotion—where, in fact, the storm among the intimate elements has been so great as to be destructive of form: Shakespeare's words, "formless ruin of oblivion," admirably express the state of things. When we do strive to bring to mind a particular sensation or emotion, it is by vivid representation of its cause, and consequent secondary excitation of it: we remember the idea, and the idea generates the emotion or the sensation. But the sensation of pain is a very different matter from the sensation of one of the senses; it is the outcry of suffering nervous element, and cannot be generated by any idea; it is not the result of organization, but the token of disorganization. How, then, should it be accurately remembered?

NOTES.

[1] (*p.* 183).—"The truth that memory comes into existence when the connexions among psychical states cease to be perfectly automatic is in complete harmony with the obverse truth, illustrated in all our experience, that as fast as the connexions of psychical states which we form in memory become, by constant repetition, automatic, they cease to be part of memory. We do not speak of ourselves as remembering those relations which become organically, or almost organically, registered; we remember those relations only of which the registration is not yet absolute. No one remembers that the object at which he is looking has an opposite side; or that a certain modification of the visual impression implies a certain distance; or that the thing which he sees moving about is a living animal. It would be a misuse of language were we to ask another whether he remembers that the sun shines, that fire burns, that iron is hard, and that ice is cold. . . . . . . And

similarly, though, when a child, the reader's knowledge of the meaning of successive words was at first a memory of the meanings he had heard given to them; yet now their several meanings are present to him without any such mental process as that which we call remembrance."—Herbert Spencer, *Principles of Psychology*, p. 551.

[2] (*p.* 186).—Jean Paul Richter, in one of his Letters, says:—"The dream is an involuntary art of poetry: and it shows that the poet works more with the bodily brain than another man. How is it that no one has wondered that in the detached scenes of dreaming, he puts in the mouth of the actors the most appropriate language, the words most exactly characteristic of their nature; or rather that they prompt him, not he them? The true poet even is in writing only the listener, not the language-teacher of his characters. . . . . Victor's observation that the opponent of his dreams often put before him more difficult objections than a real bodily one, may be made of the dramatist, who can in no manner be the spokesman of his company without a certain inspiration, though he is at the same time easily the writer of their parts. That dream-forms surprise us with answers with which we ourselves have inspired them is natural; even when awake every idea springs forth suddenly like a spark of fire, though we attribute it to our attention; but in dreams we lack the consciousness of attention, and we must thus ascribe the idea to the figure before us, to which also we ascribe the attention." Again:—"Das Mächtigste in Dichter, welches seinen Werken die gute und die böse Seele einbläset, ist gerade das Unbewusste."—*Æsthetik.*

Dr. Brown (*Philosophy of the Mind*, p. 200), when enumerating what he calls the Secondary Laws of Suggestion, lays much stress on constitutional differences in individuals—the differences of Genius, Temper, or Disposition. The *tendencies* in some minds are wholly to suggestions of *proximity;* in other minds there is a powerful tendency to suggestions of *analogy.* It is in this latter tendency to the new and copious suggestions of analogy that the distinction of genius appears to consist; a mind in which it exists is necessarily inventive; "for all to which we give the name of invention, having a relation to something old, but a relation to that which was never before suspected or practically applied, is the suggestion of analogy." There would be nothing new if objects were to suggest only, according to proximity, the very objects that had co-existed with them; "but there is a perpetual novelty of combination, when the images that arise after each other, by that shadowy species of resemblance which we are considering, are such as never existed before together or in immediate succession." Hence the rich figurative language of poetry—the expressions of resemblances that have arisen silently and spontaneously in the mind; hence the discoveries and inventions of science, &c. He goes on, too, to point out that this novelty of combination in imagination cannot depend upon the will. It is absurd, he says, to suppose that we can will directly any conception, since, if we know what we will, conception must be already a part of consciousness.

"Hence, in proportion as the memory is enriched and provided with materials, in the same proportion the rational mind, if backed by a happy genius, will be able skilfully, felicitously, and approximately, and agreeably to the truth, to distribute its analyses into series, to adjust and conclude them, of many analytic conclusions again to form new analyses, and in the end to evolve its ultimate analyses."—Swedenborg's *Animal Kingdom*, vol. ii. p. 348.

In a note he adds—"This is corroborated by the common opinion, that the knowledge and intelligence of an individual are in proportion to the furniture of his memory. But it does not follow from this, that a powerful memory is always accompanied with ability, or by an understanding of equal grasp. For the faculty of reducing the contents of memory to order is a fresh intellectual requisite. An edifice is not built simply by the accumulation of implements, bricks, tiles, and the materials. These and skill must be tasked to put all things together in their places."

PART II.

THE PATHOLOGY OF MIND.

CHAPTER I. ON THE CAUSES OF INSANITY.
" II. ON THE INSANITY OF EARLY LIFE.
" III. ON THE VARIETIES OF INSANITY.
" IV. ON THE PATHOLOGY OF INSANITY.
" V. ON THE DIAGNOSIS OF INSANITY.
" VI. ON THE PROGNOSIS OF INSANITY.
" VII. ON THE TREATMENT OF INSANITY.

CHAPTER I.

ON THE CAUSES OF INSANITY.

THE causes of insanity, as usually enumerated by authors, are so general and vague as to render it a very difficult matter to settle in the mind what they really are. But it is hardly less difficult, when brought face to face with an actual case of insanity, and when there is every opportunity of investigation, to determine with certainty what have been the causes of the disease. The uncertainty springs from the fact that, in the great majority of cases, there is a concurrence of conditions, not one single effective cause. All the conditions which conspire to the production of an effect are alike causes, alike agents; and, therefore, all the conditions, whether they are in the individual or in the circumstances in which he is placed, which in a given case co-operate in the production of disease, must alike be regarded as causes. When we are told that a man has become deranged from anxiety or grief, we have learned very little if we rest content with that. How does it happen that another man, subjected to an exactly similar cause of grief, does not go mad? It is certain that the entire causes cannot be the same where the effects are so different; and what we want to have laid bare is the conspiracy of conditions, internal and external, by which a mental shock, inoperative in one case, has had such serious consequences in another. A complete biographical account of the individual, not neglecting the consideration of his hereditary antecedents, would alone suffice to set forth distinctly the causation of his insanity. If all the circumstances, internal and external, were duly scanned and weighed, it would be found that there is no accident in madness; the disease, whatever form it might take, by whatsoever complex concurrence of conditions, or by how many successive links of causation, it might be generated, would be traceable as the inevitable consequence of certain antecedents, as plainly as the explosion of gunpowder may be traced to its causes, whether the train of events of which it is the issue be long or short. The germs of insanity are sometimes latent in the foundations of the character, and the final outbreak is perhaps the explosion of a long train of antecedent preparations.

When the causation of insanity may thus extend over a lifetime, it is easy to perceive how little is taught by specifying a single moral cause, such as grief, vanity, ambition, which may after all be, and often is, one of the earliest symptoms of the disease. Do we not, in sober truth, learn more of its real causation from a tragedy like "Lear" than from all that has yet been written thereupon in the guise of science? An artist like Shakespeare, penetrating with subtle insight the character of the individual, and the relations between him and his circumstances, discerning the order which there is amidst so much apparent disorder, and revealing the necessary mode of the evolution of the events of life, furnishes, in the work of his creative art, more valuable information than can be obtained from the vague and general statements with which science, in its present defective state, is constrained to content itself. Because of these difficulties, I believe that I shall help to accomplish my task of conveying distinct notions of the causation of insanity by bringing forward in an appendix, as illustrations, cases, the histories of which I have thoroughly investigated. Before doing this, however, it is necessary to make some general observations in order to establish certain principles, and to prevent repetition afterwards.

It is the custom to treat of the causes of insanity as physical and moral, though it is not possible thus to discriminate them with exactness. Where hereditary taint exists, for example, and is the cause of some defect or peculiarity of character which ultimately issues in insanity, one person might describe the cause as moral while another would describe it as physical. Certainly, where there existed manifest defective development of the brain in consequence of inherited mischief, as in some cases of idiocy, every one would agree as to its physical nature;

but where there was no observable morbid condition in the brain, and the evil only declared itself in a vice of disposition in the individual, most people would consider it of a moral nature, though really as certainly due to physical conditions as idiocy confessedly is. In reality, every moral cause operates through the physical changes which it produces, and in the great majority of cases in which the cause has been pronounced moral there has been something in the physical constitution by the co-operation of which the result has been brought about. Life in all its forms, physical or mental, morbid or healthy, is a relation; its phenomena result from the reciprocal action of an individual organism and external forces: health, as the consequence and evidence of a successful adaptation to the conditions of existence, implies the preservation, well-being, and development of the organism, while disease marks a failure in organic adaptation to external conditions, and leads, therefore, to disorder, decay, and death. Now it is obvious that the harmonious relation between the organism and the external world, which is the condition of health, may be disturbed either by a cause in the organism, or by a cause in the external circumstances, or by a cause, or rather a concurrence of causes, arising partly from one and partly from the other. When it is said that mental anxiety, produced by adverse circumstances, has made any one mad, there is implied commonly some inherent infirmity of nervous element which has co-operated: were the nervous system in a state of perfect soundness, and in possession of that reserve power which it then has of adapting itself, within certain limits, to the varying external conditions, it is probable that the most unfavourable circumstances would not be sufficient to disturb permanently the relation, and to initiate mental disease. But when unfavourable action from without conspires with an infirmity of nature within, then the conditions of disorder are established, and a discord, or madman, is produced.

From what has been said, it would seem that it cannot conduce to exact knowledge to maintain the violent distinction between physical and moral causes of insanity. This will appear more plainly if we call to mind the conclusions established in the First Part of this book. There it was distinctly shown that thoughts, feelings, and actions leave behind them certain residua which become organized in the nervous centres, and thenceforth modify the manner of their development, or constitute their acquired nature; consequently, the moral manifestations throughout life inevitably determine physical organization; and a slowly operating moral cause of insanity is all the while producing physical changes in the occult recesses of the supreme nervous centres of the mental life. When insanity occurs as the consummate exaggeration of a particular vice of character, as it sometimes does, the morbid mental manifestations mark an internal definite morbid action in the supreme nervous centres, —a gradually effected modification of the mental organization.

I shall deal first with the consideration of those general conditions which are thought to predispose in any way to insanity, and which may be summed up as its remote or predisposing causes.

Predisposing Causes.—There are general causes, such as the state of civilization in a country, the form of its government and its religion, the occupation, habits, and condition of its inhabitants, which are not without influence in determining the proportion of mental diseases amongst them. Reliable statistical data respecting the prevalence of insanity in different countries are not yet to be had, and even the question whether it has increased with the progress of civilization has not been positively settled. Travellers are certainly agreed that it is a rare disease amongst barbarous people, while, in the different civilized nations of the world, there is, so far as can be ascertained, an average of about one insane person in five hundred inhabitants. Theoretical considerations would lead to the expectation of an increased liability to mental disorder with an increase in the complexity of the mental organization: as there is a greater liability to disease, and the possibility of many more diseases, in a complex organism like the human body, where there are many kinds of tissues and an orderly subordination of parts, than in a simple organism with less differentiation of tissue and less complexity of structure; so in the complex mental organization, with its manifold, special, and complex relations with the external, which a state of civilization implies, there is plainly the favourable occasion of many derangements. The feverish activity of life, the eager interests, the numerous passions, and the great strain of mental work incident to the multiplied industries and eager competition of an active civilization, can scarcely fail, one may suppose, to augment the liability to mental disease. There seems, therefore, good reason to believe that, with the progress of mental development through the ages, there is, as is the case with other forms of organic development, a correlative degeneration going on, and that an increase of insanity is a penalty which an increase of our present civilization necessarily pays.

So far as facts are available in the determination of this question, they confirm the foregoing theoretical considerations. The sort of insanity most common amongst savages is imbecility, or idiocy, for the same reason that idiocy is the most common form of insanity in children: where the mind is not developed, varied degeneration of it cannot take place, though it may obviously remain morbidly arrested. It is plainly impossible, for example, that the most typical moral insanity should occur where no moral development has taken place; before the native Australian savage—who has not in his language any words for vice or justice, nor in his mind any such ideas as these words convey to an intelligent European—could become morally insane, he must first be humanized and then civilized; development must precede retrograde metamorphosis, mental organization precede mental disorganization. Another fact which deserves serious consideration is, that there has undoubtedly been a very large increase of late years in the number of the insane who have come under care and observation. The reports of the Lunacy Commissioners show that, on the 1st of January, 1849, there were 14,560 patients in the hospitals, asylums, and licensed houses of England and Wales; that six years afterwards, on the 1st of January, 1855, there were 20,493 insane; that ten years afterwards, on the 1st of January, 1865, there were 29,425 insane under certificates; and that on the 1st of January, 1866, the number had risen to 30,869. Now it is certain that this large increase is not to be attributed to an increase of insanity in the population; it is undoubtedly mainly owing (1) to the large number of cases, formerly unreported, which more stringent legislation has brought under observation; (2) to the larger number of insane, especially of paupers, who are now sent to asylums; and (3) to the prolongation of life in those who have been brought under proper care. In fact, it might be said roughly, that the greater part of this large increase in the insane population of England and Wales is due to the facts that nowadays more people are thought and declared mad than would formerly have been thought so; that more persons are admitted into asylums, where they live longer; and that fewer persons are discharged, either by death or by being thought to have recovered, than formerly. But, when all due allowance has been made for these causes, it must be admitted that a steady increase of about 1,000 a year in the insane population of England and Wales for the last seventeen years, does seem to point to an actual increase in the production of insanity, and even to an increase more than proportionate to an increasing sane population.

If we admit such an increase of insanity with our present civilization, we shall be at no loss to indicate causes for it. Some would no doubt easily find in over-population the prolific parent of this as of numerous other ills to mankind. In the fierce and active struggle for existence which there necessarily is where the claimants are many and the supplies are limited, the weakest must suffer, and some of them break down into madness. As it is the distinctly manifested aim of mental development to bring man into more intimate, special, and complex relations with the rest of nature by means of patient investigations of physical laws, and a corresponding internal adaptation to external relations, it is no marvel, it appears indeed inevitable, that those who, either from inherited weakness or some other debilitating causes, have been rendered unequal to the struggle of life should be ruthlessly crushed out as abortive beings in nature. They are the waste thrown up by the silent but strong current of progress; they are the weak crushed out by the strong in the mortal struggle for development; they are examples of decaying reason thrown off by vigorous mental growth, the energy of which they testify. Everywhere and always "to be weak is to be miserable."

If we want a striking illustration of the operation of this hard law, we may see it in the appropriation by man, the stronger sex, of all the means of subsistence by labour, to the almost entire exclusion of women, the feebler sex. Because, however, women are necessary to the gratification of man's passions, indispensable to the comfort of his life, they are not crushed out of existence, they are only kept in a state of subjection and dependence. The woman who can find no opening for her honourable energies in the present social system, is yet willingly permitted to gain a precarious livelihood by selling the charms of her person to gratify the lusts of her lord and master. Under the institution of marriage she has the position of a subordinate, herself debarred from the noble aims and activities of life, and ministering, in a silent manner, to the comfort and greatness of him who appropriates the labour and enjoys the rewards. Practically, then, woman has no honourable outlook but marriage in our present social system: if that aim is missed, all else is missed. Through generations her character has been formed with that chief aim; it has been made feeble by long habit of dependence; by the circumstances of her position the sexual life has been undesignedly developed at the expense of the intellectual. Now, therefore, when the luxuries thought necessary in social life are so many and costly that marriage is much avoided by men, there is a cruel stress laid upon many a gentle nature. In this disappointment of their life-aim, and the long train of consequences, physical and moral, which it unconsciously draws after it, there is, I believe, a fertile source of insanity among women. It is not only that women of the better classes, not married, have no aim in life to work for, no opening for the employment of their energies in outward activities, and are driven to a morbid self-brooding, or to an excessive religious devotion or a religious enthusiasm which is too often the unwitting cloak of an exaggerated and unhealthy self-feeling; but, through the character produced by the position which they have so long held in the social system, their organic life is little able to withstand the consequences of an unsatisfied sexual instinct. Disturbances of all sorts ensue, and social customs debar them from the means of relief which men have both in active employment and in unmarried sexual indulgence. Masturbation is undoubtedly sometimes provoked, and aggravates the evil for which it was sought as a relief. Let it not be supposed, however, that all these things take place consciously in the woman's thoughts, feelings, and actions: the sexual passion is one of the strongest passions in nature, and as soon as it comes into activity, it declares its influence on every pulse of the organic life, revolutionizing the entire nature, conscious and unconscious; when, therefore, the means of its gratification entirely fail, and when there is no vicarious outlet for its energy, the whole system feels the effects, and exhibits them in restlessness and irritability, in a morbid self-feeling taking a variety of forms, and in an act of self-abuse which on the first occasion may, I believe, be a sort of instinctive frenzy, of the aim of which there is only the vaguest and most dim notion.

Another way in which over-population leads to deterioration of the health of a community is by the overcrowding and the insanitary condition of dwelling-houses which it occasions in towns. Not fevers only, but scrofula, perhaps phthisis, and certainly general deterioration of nutrition, are thus generated and transmitted as evil heritages to future generations: the acquired ill of the parent becomes the inborn infirmity of the offspring. It is not that the child necessarily inherits the particular disease of the parent, for diseases unquestionably undergo transformation through generations; but it does often inherit a constitution in which there is a certain inherent aptitude to some kind of morbid degeneration, or a constitution destitute of that reserve power necessary to meet the trying occasions of life. Lugol found insanity to be by no means rare amongst the parents of the scrofulous and tuberculous; and in one chapter of his work on Scrofula treats of hereditary scrofula from paralytic, epileptic, and insane parents. Schroeder van der Kolk was also of opinion that a hereditary predisposition to phthisis might develop into or predispose to insanity; and, on the other hand, that insanity predisposed to phthisis. It is certain that there are very intimate relations between phthisis and insanity: one-fourth of the deaths in asylums are caused by phthisis; and Dr. Clouston, who found that there is hereditary predisposition in 7 per cent. more of the cases of insanity with tubercle than of the insane generally, has described a certain form of insanity as phthisical insanity. Watching the decay of a family, it is often seen that phthisis and insanity are of frequent occurrence amongst its members; and when extinction of it occurs, when the last of the family dies, he not seldom dies insane or phthisical or both. When we reflect that a disease is not a specific morbid entity that, like some evil spirit, has taken mischievous possession of the body, or of a particular part of it, but a condition of more or less degeneration from healthy life in an organism whose different parts constitute one harmonious whole, it will be sufficiently evident that a disease of one part of the organism will not only affect the whole sympathetically at the time, but may lead to a more general infirmity in the next generation—to an organic infirmity which shall be determined in its special morbid manifestations according to the external conditions of life.

Perhaps one, and certainly not the least, of the ill effects which come from some of the conditions of our present civilization is seen in the general dread and disdain of poverty, in the eager passion to become rich. The practical gospel of the age, testified everywhere by faith and works, is that of money-getting; men are estimated mainly by the amount of their wealth, take social rank accordingly, and consequently bend all their energies to acquire that which gains them esteem and influence. The result is that in the higher departments of trade and commerce speculations of all sorts are eagerly entered on, and that many people are kept in a continued state of excitement and anxiety by the fluctuations of the money market. In the lower branches of trade there is the same eager desire for petty gains; and the continued absorption of the mind in these small acquisitions generates a littleness of mind and meanness of spirit, where it does not lead to actual dishonesty, which are nowhere displayed in a more pitiable form than in certain petty tradesmen. The occupation which a man is entirely engaged in does not fail to modify his character, and the reaction upon the individual's nature of a life which is being spent with the sole aim of becoming rich, is most baneful. It is not that the fluctuations of excitement unhinge the merchant's mind and lead to maniacal outbreaks, although that does sometimes happen; it is not that failure in the paroxysm of some crisis prostrates his energies and makes him melancholic, although that also is occasionally witnessed; but it is that the exclusiveness of his life-aim and occupation too often saps the moral or altruistic element in his nature, makes him become egoistic formal, and unsympathetic, and in his person deteriorates the nature of humanity. What is the result? If one conviction has been fixed in my mind more distinctly than another by observation of instances, it is that it is extremely unlikely such a man will beget healthy children; that, in fact, it is extremely likely that the deterioration of nature, which he has acquired, will be transmitted as an evil heritage to his children. In several instances in which the father has toiled upwards from poverty to vast wealth, with the aim and hope of founding a family, I have witnessed the results in a degeneracy, mental and physical, of his offspring, which has sometimes gone as far as extinction of the family in the third or fourth generation. When the evil is not so extreme as madness or ruinous vice, the savour of a mother's influence perhaps having been present, it may still be manifest in an instinctive cunning and duplicity, and an extreme selfishness of nature—a nature not having the capacity of a true moral conception or altruistic feeling. Whatever opinion other more experienced observers may hold, I cannot but think, after what I have seen, that the extreme passion for getting rich, absorbing the whole energies of a life, does predispose to mental degeneration in the offspring—either to moral defect, or to moral and intellectual deficiency, or to outbreaks of positive insanity under the conditions of life.

Without going on to enumerate other causes which arise out of our present civilization, and appear to favour the increase of insanity, it will be sufficient to say that any condition that is injurious to mental or bodily health, though it does not produce insanity directly, may so far predispose to it in the next generation—determining in the present what shall be predetermined in the future. But while giving due weight to this consideration, it is necessary to bear in mind that an increase in the number of insane persons in a country does not mean the degeneracy of the people: the capability of development is the capability of degeneration, and where the general progress is going on actively the retrograde action in the elements must be going on also: the particular is sacrificed to the general, "the individual perishes, but the race is more and more." If this be so, may we not then say that an increase of insanity is after all a testimony of development, that a great apparent evil is but a phase in the working out of good; may we not, indeed, ask with the prophet, "Shall there be evil in the city, and the Lord have not done it"?

Sex.—Esquirol and Haslam thought insanity to be of more frequent occurrence among women than men, but authors are now generally agreed that the converse is true. Dr. Thurnam affirms men to be more liable to mental disorder than women; and Dr. Jarvis came to the same conclusion from an examination of the statistics of different countries. Recently it has been said that the female sex is more liable to suffer from hereditary insanity. If my experience were large enough to be of any value, it would give the preponderance to the women: of 106 persons whom I admitted into a lunatic hospital, there were 50 men and 56 women. This result agrees closely with the statistics of the number of people confined in asylums in England and Wales: on the 1st of January, 1855, there were in the hospitals, asylums, and licensed houses 10,885 females and 9,608 males, and on the 1st of January, 1866, 15,437 females and 13,988 males—the numbers giving a preponderance of from about five to six per cent. to women.* On whichever side, male or female, the uncertain difference lies, it is probably inconsiderable. There is scarcely sufficient ground to maintain that there is by simple reason of sex any inborn liability to insanity. The female sex is certainly the weaker, and on this account will be more likely to suffer from the adverse circumstances of life, especially in a complex social state where it is precluded so much from active work, has so few resources, and is enfeebled by dependence; it has moreover conditions which in some regard favour disturbance in the revolutions effected in the system at puberty, during pregnancy, by the puerperal state, and at the climacteric period. These conditions, in concurrence with the circumstances of female life, may possibly become the cause of more frequent insanity amongst women; and one is the more apt to think so when one calls to mind that causes which undoubtedly act more frequently amongst men—intemperance and other excess, for example—do not avail to notably increase the proportion of insanity amongst them. On the whole I should be disposed to hold that, while the number of men and of women who become insane appears to differ but little, as the causes actually operate, there is in woman, by virtue of her sex, a slightly greater predisposition to insanity than in man.

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* It must be remembered, however, that the proportion of women in the population slightly exceeds that of men, and that general paralysis, which is particularly fatal, is almost confined to men.

Education.—Next to the inherited nature which every one has, the acquired nature which he owes to the circumstances of his education and training is most important in determining the character. I mean, not the education which is called learning alone, but that education of the nature of the individual, that development of the character, which the circumstances of his life have determined. There are in every nature its particular tendencies or impulses of development which may be fostered or checked by the conditions of life; and which, therefore, according to their good or evil nature, and the external influences which they meet with, may minister to the future weal or woe of the individual—may lead to a stability of character which prevents the mental equilibrium ever being seriously disturbed, or to such an instability of character that the smallest adversity may destroy it for ever. How often one is condemned to see, with pain and sorrow, an injudicious education sorely aggravate an inherent mischief! The parent not only transmits a taint or vice of nature to the child, but fosters its evil growth by the influence of a bad example, and by a foolish training at the time when the young mind is very susceptible, and when the direction given to its development is sometimes decisive for life. Where there is no innate taint, evil may still be wrought by enforcing an unnatural precocity, wherein is often planted the germ of future disease. Parental harshness and neglect—repressing the child's feelings, stifling its need of love, and driving it to a morbid self-brooding, or to take refuge in a world of vague fancies—is not less pernicious than a foolish indulgence through which it never learns the necessary lessons of renunciation and self-control. The aim of a good education should be to develop the power and habit of what the events of life will not fail to rudely enforce—renunciation and self-control, and to lead to the continued transference of thoughts and feelings into external actions of a beneficial kind. By the habitual encouragement of self-feeling, and by an egoistic development in all the relations of life, a character may, by imperceptible degrees, be so framed that insanity is the natural and consummate evolution of it, while every step taken in such deterioration will so far predispose to insanity under adverse circumstances of life.

It is hardly necessary to point out how ill adapted the present system of female education is to store the mind with useful knowledge, and to train up a strong character. It is peculiarly fitted for the frivolous purposes of female life; but that it is so is its greatest condemnation. As the education of women is widened, deepened, and improved, other and better resources will be discovered and earnestly used, and the reaction of a higher mode of life on female education and female nature cannot fail to be most beneficial.

Religion.—I have said that the practical religion of the day, the real guiding gospel of life, is money-getting: the professed religion is Christianity. Now, without asserting that riches are not to be gotten by honest industry, it may be maintained that the eager passion to get rich—honestly, it may be; but, if not, still to get rich—is often inconsistent with the spirit of the gospel professed. The too frequent consequence is, that life becomes a systematic inconsistency, or an organized hypocrisy. With a profession of faith that angels might adopt, there is too often a rule of practice which devils need not disdain. I do not speak here of those whose religion is a mere social observance, which it beseems a man of respectability willing to stand well with his neighbours to conform to. Such persons will, in all probability, belong to the Church of England, which is eminently the religion of success in life and of a respectable social position: it does not demand any exhibition of zealous earnestness from, nor does it impose any galling yoke upon, its members; it desires to avoid anything that is extreme, and insists only on the maintenance of the social proprieties: it is the established religion, and, in close alliance with the governing classes, it aims at the preservation of the established state of things. But it may be questioned whether the Church of England really reaches the poor and struggling, those who truly need a gospel of life. Those of them who have any religion at all belong, for the most part, to two religious bodies into which the two extreme parties in the English Church insensibly merge—to Roman Catholicism and Methodism. When, therefore, we have to consider a religion really influencing life, when we have to weigh its effect on character as predisposing or not to insanity, we have practically to deal with Roman Catholicism, actual or abortive, or with Dissent in some of its forms. I do not hesitate to express a conviction that the excitement of religious feelings, and the moroseness of the religious life, favoured by some of the Dissenters, are habitually injurious to the character, and are sometimes a direct cause of insanity. Young women who fail to get married are apt to betake themselves fervently to religious exercises, and thus to find an outlet for repressed feeling in an extreme devotional life; having of necessity much self-feeling, they naturally fly to a system which expressly sanctions and encourages a habit of attention to the feelings and thoughts—a self-brooding—and which attracts to them the sympathy and interest of others. This is not, nor can it come to, good: as the man whose every organ is in perfect health scarcely knows that he has a body, and only is made conscious that he has organs when something morbid is going on, so a healthy mind in the full exercise of its functions, is not conscious that it has feelings, and is only awakened to self-consciousness by something morbid in the processes of its activity. To fly for refuge to the contemplation of one's own feelings and thoughts is in direct frustration of the purposes of one's being as an element in nature, and in the direct way of predisposing to insanity. It is only in actions that we truly live, and by our actions that we can truly know ourselves. How mischievous, then, any encouragement of a morbid self-feeling, religious or otherwise, is likely to be, it is easy to perceive. Among the cases of mental disease that have come under my care, there are some in which the cause of the outbreak has been satisfactorily traceable to religious influence injudiciously exerted. Not amongst Dissenters only, but amongst those members of the High Church party in the Church of England who are so much addicted to playing at Roman Catholicism, the most baneful effect is sometimes produced on women through the ignorant influence and misapplied zeal of priests, who mistake for deep religious feeling what is really sometimes a morbid self-feeling, arising out of an unsatisfied sexual instinct, and what is many times accompanied by hysterical excitement, and sometimes even by habitual self-abuse.

The Roman Catholic religion cannot, I believe, be justly charged with any such positive influence for evil on those who have been born and bred up within its pale. On them its effect is rather to arrest mental development by imposing the divine authority of the Church, and thus keeping the mind in leading-strings. The unquestioning faith demanded and accorded as the habit of life is not calculated to predispose to insanity. But the influence of Roman Catholicism, as represented by some of the over-zealous perverts from the English Church, is in the highest degree mischievous: it is a hotbed, fostering the weaknesses of weak women, the morbid tendencies of those who are half insane, and, too often, the evil impulses of the vicious. It becomes the congenial refuge of those who are so afflicted with restless passions, ill-regulated feelings, and selfish impulses, that they are unable to conform long to their social duties and relations, and are ever eager for change, excitement, and attention, at whatever cost. Without doubt a hot religious perversion, and the earnest display of a feverish religious zeal, are, in some instances, really a phase in the manifestations of a morbid disposition, not unlikely to pass at some time into actual mental derangement.

In weighing the effect on the mind of any form of religion, it is necessary to bear in mind that a person's particular creed is to some extent the result of his character and mode of development. The egoist whose vanity and self-love have not other outlets of display will manifest his disposition in his religious views and practice. The victim of a morbid self-feeling, or an extreme self-conceit, will find in a certain religious zeal the convenient gratification of an egoistic passion, of the real nature of which he himself is ignorant. Those who make it their business to get rich by over-reaching and deceiving others, invariably end by over-reaching and deceiving themselves in the sincere assumption of religious observances entirely inconsistent with the tenor of their daily lives. When such persons become insane, we cannot truly say that religion has been the cause of the disease, although it can admit of no question that the mental degeneration, which has been the natural issue of the mode of development of the character, has found in the religious views and practices adopted circumstances very favourable to its increase.

Condition of Life.—The statistics hitherto collected with reference to this point are of little or no value. Whether a particular profession or trade favours the production of insanity, is generally a question of the habits incidental to its pursuit, —whether those who follow it live soberly and temperately, or whether they are addicted to intemperance and riotous living. On the whole, however, those who work with the head are more liable to mental disease than those who work with the hand, and they are less likely to recover when once attacked: the more complex mental organization of the former, and the greater activity of function, will render it conceivable how that should be so. Other things being equal, it is certain that insanity is more frequent amongst the unmarried than amongst the married.

Age and Period of Life.—Insanity is rare before puberty, although it is certain that every form of it, except general paralysis, may occur even so early in life. Idiocy is the most common form of mental defect in the early years of life; and even the cases of mania met with occasionally in children partake a good deal of the character of idiocy, and might be described as examples of excited idiocy. The mental organization has not been completely accomplished, and the symptoms of its degeneration are therefore somewhat uniform in character. Between the ages of sixteen and twenty-five, insanity is far more frequent; but it is the most frequent of all during the period of full mental and bodily development—from twenty-five to forty-five—when the mental functions are most active, and when there is the widest exposure to its causes. The internal revolution which takes place in women at the climacteric period leads to many outbreaks of a melancholic insanity in them between forty and fifty. In the male there appears to be a climacteric period between fifty and sixty, when insanity sometimes supervenes. In old people symptoms of mental derangement sometimes precede for a time softening of the brain and dementia; an old man may be found to be keeping a mistress in secret, or to be making foolish proposals of marriage, when sensual impulses only mock extinct sexual functions.

Hereditary Predisposition.—The more exact and scrupulous the researches made, the more distinctly is displayed the influence of hereditary taint in the production of insanity. The main value, indeed, of the many doubtful statistics collected in reference to this point is to prove that, with the increase of opportunities of obtaining exact information, the greater is the proportion of cases of insanity in which hereditary predisposition is detectable. This proportion is put by some authors—as Moreau—as high as nine-tenths, by others as low as one-tenth; the most careful researches agreeing to fix it as not lower than one-fourth, if not so high as one-half. Of fifty insane persons, taken without any selection, the family histories of whom I was able to trace with considerable precision, there was strongly marked hereditary predisposition—that is, there was the positive evidence of an *inherited* predisposition to insanity—in fourteen cases; while there was in ten more cases sufficient evidence of an inborn infirmity or instability of nervous element, not due to actual insanity in any of the immediate ancestors, but *acquired* or *developed* in them for the first time, in consequence of degenerative influences at work. Two important considerations in regard to this question should have full weight given them: first, that the native infirmity or taint may be of very different degrees of intensity, so as, on the one hand, to conspire only with certain more or less powerful exciting causes, or, on the other hand, to give rise to insanity even amidst the most favourable external circumstances; secondly, that not insanity only in the parents, but any form of nervous disease in them—epilepsy, hysteria, and even neuralgia—may predispose to insanity in the offspring, as, conversely, insanity in the parent may predispose to other kinds of nervous disease in the offspring. Whatever, then, may be the exact number of cases in which hereditary predisposition is positively ascertained, it may, I think, be broadly asserted that, in the great majority of cases, whether there has been observable madness or not in father or mother, or some remoter relative, there has been some constitutional instability or infirmity of nervous element in the individual whereby he has been unable to rally against adversity, and has broken down in insanity. Infinitely various as the constitutional idiosyncrasies of men notably are, it is easy to perceive how impossible it is that statistics should ever give exact information concerning the causation of insanity; here, as in so many instances of their application, their value is that they settle distinctly the existence of a certain *tendency*, so to speak, which, once fixed, affords a good starting-point for further and more rigorous researches: they indicate the direction of future investigation.

Careful inquiries into the sundry and manifold causes of nervous degeneration could not fail to attract attention to the metamorphoses which diseases undergo in hereditary transmission, as a matter demanding exact study. We certainly distinguish in our nomenclature the different nervous diseases, but, as we actually meet with them in practice, the disorders of the different nervous centres may occasionally blend, or combine, or replace one another in a remarkable manner, so as to give rise to varieties of disease intermediate between those which are commonly regarded as typical. Now this circumstance, manifest enough in individual life, is much more plainly displayed when we trace the history and progress of nervous disease through generations. If, instead of limiting attention to the individual, we scan the organic evolution and decay of a family—processes which, as in the organism, are sometimes going on simultaneously—then it is made sufficiently evident how close are the fundamental relations of nervous diseases, how artificial the divisions between them may sometimes appear. Epilepsy in the parent may become insanity in the offspring, or insanity in the parent epilepsy in the child; and chorea or convulsions in the child may be the consequence of great nervous excitability, natural or accidental, in the mother. In families in which there is a strong predisposition to insanity, it is not uncommon to find one member afflicted with one form of nervous disease, and another with another; one suffers perhaps from epilepsy, another from neuralgia or hysteria, a third may commit suicide, and a fourth become maniacal. General paralysis is a disease which is usually the result of continued excesses of one sort or another; but it may unquestionably occur without any marked excesses, and when it does so there will mostly be discoverable a hereditary taint in the individual. More than this: an innate taint or infirmity of nervous element may modify in a striking manner the mode of manifestation of other diseases; where it exists, gout flying about the body may produce obscure nervous symptoms, so as greatly to puzzle the inexperienced practitioner, and the syphilitic poison is similarly apt to seize upon the weak part, and to give rise to severe nervous symptoms. On the other hand, it can admit of no question that a parental disease which does not specially affect the nervous system, may, notwithstanding, be at the foundation of a delicate nervous constitution in the offspring: phthisis, scrofula, syphilis, perhaps also gout and diabetes, may act thus banefully.

The interesting researches of Morel into the formation of degenerate or morbid varieties of the human race have served to furnish a philosophical view of the chain of events by which causes that give rise to individual degeneracy continue their morbid action through generations, and finally issue in the extinction of the family. When some of the evil influences which notably give rise to disease—whether the poisoned atmosphere of a marshy district, or the unknown endemic causes of cretinism, or the overcrowding and starvation of our large towns, or persistent intemperance of any kind, or frequent intermarriages in families, or any other of the sources of human degeneracy—have engendered a morbid variety, the evil will, unless counteracted by better influences brought to bear, increase through generations, until the degeneration has gone so far that the continuance of the species is impossible. Indeed, insanity of what form soever, whether mania, melancholia, moral insanity, or dementia, is but a stage in the descent towards sterile idiocy, as may be experimentally proved by the intermarriage of mentally unsound persons for a generation or two, and as is sometimes demonstrated by the disastrous consequences of frequent intermarriages in foolish families. Morel relates the history of one family, which may be adduced as a typical example of the course of degeneration proceeding unchecked, and which may be summed up thus:—

First generation.—Immorality. Alcoholic excess. Brutal degradation.

Second generation.—Hereditary drunkenness. Maniacal attacks. General paralysis.

Third generation.—Sobriety. Hypochondria. Lypemania. Systematic mania. Homicidal tendencies.

Fourth generation.—Feeble intelligence. Stupidity. First attack of mania at sixteen. Transition to complete idiocy, and probable extinction of the family.

In this degeneration going on through generations we have a retrograde movement which is the opposite of that progressive specialization, and increasing complexity of relation with the external, which have already been described as characteristic of advancing development. In place of sound and proper elements, which may take their due place and perform their co-ordinate function in the social organism, there are produced morbid varieties fit only for excretion. For, in truth, we may not improperly compare the social fabric to the bodily organism in this regard: as in bodily disease there is a retrograde metamorphosis of formative action, and morbid elements are produced, so in the appearance of insanity in individuals we have examples of the formation of morbid varieties in the social organism, and the evidence of a degeneration of the human kind. And as in the body morbid elements cannot minister to healthy action, but, if not got rid of, give rise to disorder, and even death; so in the social fabric morbid varieties are themselves on the way of death, and if not sequestrated in the social system, or extruded from it, inevitably engender disorder incompatible with its stability. But, however much man may degenerate from his high estate, he never really reverts to the exact type of the animal, though he may sink lower than it: the so-called *theroid degeneration*, spoken of by some writers, signifies no more than a resemblance to the animals. As it is among plants, where degeneration of species notably gives rise to a new morbid kind, so it is in man: lunatics and idiots represent new morbid kinds: the mighty are fallen, but the might is manifest even in the wrecks.

Baillarger has confirmed what Esquirol had observed, that insanity descends more often from the mother than the father, and from the mother to the daughters more often than to the sons. Children born before the outbreak of an attack are less likely to suffer than those born after an outbreak.

Thus much concerning the remote or predisposing causes of insanity: it remains now to set forth the direct or proximate causes of defect or derangement of the supreme centres of intelligence. In doing this it will be most convenient, and in the end most philosophical, to describe them under similar divisions to those under which have already been grouped the causes of disorder of the ganglionic, sensori-motor, and spinal centres—in other words, to treat of the causation of insanity from a pathological point of view.

THE PROXIMATE CAUSES OF DISORDER OF THE IDEATIONAL NERVOUS CENTRES, THE SUPREME GANGLIONIC CELLS OF THE CEREBRAL HEMISPHERES, THE INTELLECTORIUM COMMUNE.

1. *Original Differences in the Constitution of the Supreme Nervous Centres.*—It is most certain that there exist great natural differences between different people in respect of the development of their cerebral convolutions. In the lower races of men these are visibly less complex and more symmetrical than in the higher races; the anatomical differences corresponding with differences in intellectual capacity. Place a Bushman, with his inferior type of brain, in the complex circumstances of civilized life; and though he may represent a high grade of development of his lower type, he is to all intents and purposes, as Gratiolet allows, an idiot, and must, unless otherwise cared for, inevitably perish in the severe competition for existence. And if a person, from some arrest of the natural development, is born amongst civilized people with a brain of no higher order than the natural brain of the Bushman, it is plain that he will be more or less of an idiot; a higher type of brain, arrested by morbid causes at a low grade of development, is brought to the level of a lower type of brain which has arrived at its full development. As Von Baer long ago pointed out, the actual position of a particular animal in the scale of life is determined, not by the type alone, nor by the grade of development alone, but by the product of the type and the grade of development.

The principal varieties of defective brain met with may be briefly indicated here as falling under one of the following divisions:—

(*a*) There are idiots of the *microcephalic* type, in whom an arrest of cerebral development has taken place, and a palpably defective brain is met with in consequence. Malacarne was at the pains carefully to count the laminæ of the cerebellum in idiots and in men of intelligence, and he found them to be less numerous in the former than in the latter. Now, these laminæ are less numerous in the chimpanzee and the orang than in man, and still less numerous in other monkeys; so far, therefore, there is an approximation in some idiots to the simian type of brain. Mr. Paget mentions an idiot's brain in which there had been a complete arrest of development at the fifth month of fœtal life: there were no posterior lobes, the cerebellum being only half-covered by the cerebral hemispheres. Gratiolet found in the brain of a microcephalic idiot, aged seven, the under surface of the anterior lobes much hollowed, with great convexity of the orbital arches, as is the rule in the monkey.* Mr. Marshall has carefully examined, and described in an elaborate paper, the brains of two idiots of European descent: the convolutions were fewer in number than in the apes, individually less complex, broader, and smoother—"In this respect," he observes, "the idiots' brains are even more simple than the brain of the gibbon, and approach that of the baboon (Cynocephalus) and sapajou (Ateles)."† Though he agrees with other observers that the condition of the cerebra in the idiots is neither the result of atrophy, nor of a mere arrest of *growth*, but consists essentially in an imperfect evolution of the cerebral hemispheres or their parts, dependent on an arrest of *development*, he points out the strong grounds there are for inferring that, after the cessation of evolutional changes, the cerebra experience an increase of size generally, or a mere growth of their several parts. Consequently the cerebra are much larger than fœtal cerebra in which the convolutional development is at a similar stage; whilst the individual convolutions themselves, though the same in number, are necessarily broader and deeper. Not only is the brain-weight in microcephalous idiocy very low absolutely, as the instructive tables of Dr. Thurnam show, but the relative amount of brain to body is "extraordinarily" diminished. Thus in the two idiots described by Mr. Marshall the proportion of brain to body was only as 1 to 140 in the female, and as 1 to 67 in the male, the normal proportions being as 1 to 33 and as 1 to 14 respectively. It is not necessary that I quote more authorities to prove that small-headed idiots have small brains, and sometimes even fewer and more simple convolutions than the chimpanzee and the orang: that man, thus made a *morbid kind* by an arrest of development, is brought to a lower level than that of his nearest related fellow animal. A strict examination of the stories of wild men, as of Peter the Wild Boy, and the young savage of Aveyron, has proved that these were really cases of defective organization—pathological specimens.*

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* Anatomie comparée du Système Nerveux.

† Philosophical Transactions, *loc. cit.*

(*b*) In idiots or imbeciles of the Cretin type, where the morbid condition is endemic, the defect seems to depend on certain morbid changes which primarily affect the skull rather than the brain. Injurious influences, affecting the general processes of the bodily nutrition, prevent the normal growth of the bones, and lead to a premature ossification of the sutures, and a consequent narrowing of the skull at the part where this happens. Secondary wide interference with the development of other parts of the skull and compensating enlargements in other directions follow the primary evil, and give rise to cranial deformities of various kinds. Of necessity the natural growth of the brain is hindered by those morbid changes; and it is no wonder that the deformed head of the Cretin is accompanied with a torpid apathetic character and with great mental deficiency. As the evil changes are commonly not manifest until a year or more after birth, an objection might well be made to the description of them as original defects; but whatever the nature of the unknown morbid influence which is the cause of cretinism, whether malarious or not, it can admit of no question that it acts upon the mother perniciously, and predetermines the cretinism of the child.

(*c*) It is obvious that an arrest of the development of the brain occurring soon after birth may give rise to idiocy just as certainly as an arrest occurring some time before birth. And although an objection might here again be made to the description of such a defect as original, yet if we reflect that the important development of the brain as the supreme organ of the conscious life, as subserving the mental organization, does really take place after birth, we may admit a defect rendering such development impossible to be, though not congenital, practically original. There are many idiots in whom the brain and body appear to be well formed, while the mental development remains at the lowest stage. Accidental affections of the brain arresting its development after birth, while the rest of the body goes through its normal growth, have occurred in some of these cases; epilepsy is not uncommonly such a cause of idiocy; but it is impossible in some cases to assign any definite cause of the arrest. Other idiotic creatures have the development of the body as well as mind arrested: the extremest cases of this kind are those in which there has been a complete cessation of growth at an early period of childhood, without any observable deformity. Dancel has recorded the case of a girl, aged twenty-four, who had developed normally up to the age of three and a half years, after which no further growth took place until she reached eighteen and a half years, her bodily and mental condition being that of a child of three and a half years old. At twenty-one she increased a very little in size and then remained unchanged for the rest of life. Baillarger exhibited, in May 1857, to the French Academy of Medicine, a young woman aged twenty-seven, who only had the intelligence and inclinations of a child four years old, and who was about three feet high. I have seen a somewhat similar instance in an idiot boy. These extreme and singular cases are well calculated to excite surprise and curiosity; they are, however, only the manifest consequences of a deficiency in developmental power which is not unfrequently met with in less marked degree, and which is actually witnessed in every sort of degree. In any large idiot asylum there are to be found some who, without any particular deformity, without any observable disease of brain or defective development of it, are generally sluggish both in bodily and mental development; their size is small; their sexual development takes place late in life, or perhaps does not take place at all; they often exhibit some peculiarity of countenance, perhaps a squint; in mental capacity they are in advance of the true idiots, for they can learn a little, are capable of remembering, and sometimes imitate cleverly: some of them constitute the "show-cases" of the idiot asylum when they are in it; and when they are not, they may become difficult cases for medico-legal inquiry, in which the decision come to, whatever it be, may be challenged not without reason. All the concern that we have with them here is to draw from them the certain conclusion that there may, by reason of unknown conditions affecting nutrition, be every degree of imperfect development of mind and body down to actual incapacity to develop at all.

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* Observations on the deranged Manifestations of the Mind. By J. S. Spurzheim, M.D.

When there are no such signs of degeneracy as to warrant the mention of idiocy even in its mildest form, there is still abundant room for physical causes of psychical defect, without our being able to recognise them. The exceeding sensibility of nervous structure, whereby an impression made at one point is almost instantaneously felt at any distance, is the sure testimony of delicate, active, but occult movements of its molecules which, like thermal oscillations or undulations of light, or the intimate molecular conditions of colour, belong to that inner life of nature that is still impenetrable to our most delicate means of investigation, still inaccessible to our most subtle inquiries. Who can say what is the nature of those hidden molecular activities which are the direct causes of our different tastes and smells? Could we but ascertain what these fundamental processes essentially are, we might perhaps attain to some knowledge of the intimate constitution of bodies; indeed it seems not improbable that in the scientific cultivation and development of the senses of taste and smell, as the eye, the ear, and the touch have been cultivated and developed, we may ultimately gain some means of insight into the inner recesses of nature.

A second reason why there may be numerous and serious defects of nervous structure without its being possible to recognise them, arises from the infinitely complex and exquisitely delicate structure of the cortical layers of the hemispheres. It would certainly be most unwarrantable to assume that physical paths of nervous activity in the supreme centres may not be actually obliterated without our being any the wiser, when it was only yesterday, so to speak, that men succeeded, after infinite patient research, in demonstrating a direct communication between the different nerve-cells, and between nerve fibres and cells. The obliteration of such a physical communication in the supreme centres would simply render impossible a certain association of ideas, or the transference of the activity of the idea to a nerve fibre—the expression of the mind.

Thirdly, it must be admitted that, all question of defect of physical structure put aside, the extremest derangement of function might be due to chemical changes in nerve element—changes which, in the present state of knowledge, are still less discoverable than physical changes in so complex a compound. Examine the cells of a man's brain at the end of a day of great mental activity, and at the beginning of a day after a good night's rest; what difference would be detectable? None whatever; yet the actual difference is between a decomposition and a recomposition of nerve element—between a capacity and an incapacity of function.

It is beyond question then that there may be modifications of the polar molecules of nervous element, changes in its chemical composition, and defects in the physical constitution of nervous centres, all of which, entirely undetectable by us, do nevertheless most gravely affect function, and are thus most surely testified.

To affirm, then, that all men are born equal, as is sometimes heedlessly done, is to make about as palpably untrue a proposition as it is possible to make in so many words. There is as great a variety of minds as there observably is of faces or of voices: as no two faces and no two voices are exactly alike, so are no two minds exact counterparts of one another. Men differ greatly both in original capacity and in quality of brain. In some there is the potentiality of great and varied development, whilst in others there is the innate incapacity of any development; and between the two extremes every gradation exists. There are important differences also in the quality of the brain in different people: in some the mental reaction to impressions is sluggish and incomplete, and, without being idiots, they are slow at perception and stupid; in others, the reaction, though not quick, is very complete, and they retain ideas very firmly, although they are slow at acquiring them; in some, again, the reaction is rapid and lively, but evanescent, so that, though quick at perception, they retain ideas with difficulty; while in others, that just equilibrium between the internal and external exists by which the reaction is exactly adequate to the impression, and the consequent assimilation is most complete. These natural differences in the taking up of impressions plainly hold good also of the further processes of digestion and combination of idea, which in the progress of mental development follow upon the concrete perception. It is easy surely to perceive that we have, as original facts of nature, every kind of variation in the quality of mind and in the degree of reasoning capacity.

So long as we are unable to discover any explanation of the causation of a fact which yet seems to stand out very distinctly, it is wonderful how difficult it is to accept it heartily, how easy indeed it becomes to overlook it habitually; but as soon as we have attained to a knowledge of its cause and relations, then the recognition of it becomes a part of our habit of thought and perception: it has entered into our mental organization. Because it has been the fashion to look upon an individual as though he were the product of an independent creative act, and a self-sufficient being—because men commonly look not beyond a single link in the chain of causation—therefore it has been impossible hitherto to uproot the erroneous notion, explicitly or implicitly held, that each one is endowed by nature with a certain fixed mental potentiality of uniform character. But, now that observation reveals more and more clearly every day how much the capacity and character, bodily and mental, of the individual is dependent upon his ancestral antecedents, it is impossible to deny that a man may suffer irremediable ill through the misfortune of a bad descent. Each one is a link in the chain of organic beings, a physical consequent of physical antecedents; the idiot is not an accident, nor the irreclaimable criminal an unaccountable casualty; the laws of causality have sway here as elsewhere in nature. It cannot but be, therefore, of the utmost importance, when tracing the causation of insanity, to weigh closely the elements of the individual character.

Viewed on its physical side, as it rightly should be viewed, a predisposition to insanity means nothing less than some defect or vice in the actual constitution or composition of the nervous element of which the mental phenomena are functional manifestations; there is an instability of organic composition, the direct result of certain unfavourable physical antecedents. The retrograde metamorphosis of mind, manifest in the different kinds of insanity, and proceeding as far as actual extinction in extreme examples of dementia, is the further physical consequence of the hidden defect of constitution or composition of nervous element. It is easy enough, no doubt, to point to the nervous substance of the infertile idiot's brain, and to that of the philosopher's, and to maintain that the kind of organic element of which they are constituted is the same, as it appears to be; but so long as we have no exact knowledge of the constitution of nervous element, such an assertion is an unwarrantable assumption; and, while the functional effects are so widely different in the two cases, there are the most valid reasons for contradicting it.

The conclusion, then, at which we have arrived is, that when an individual is, by reason of a bad descent, born with a predisposition to insanity, he has a native constitution of nervous element which, whatever name we give it, is unstable or defective, rendering him unequal to bear the severe stress of adverse events. In other words, the man has *the insane temperament;* he is liable to whimsical caprices of thought and feeling; and, although he may act calmly and rationally for the most part, yet now and then his unconscious nature, overpowering and surprising him, instigates eccentric or extravagant actions; while an extraordinary and trying emergency may upset his stability entirely. If it were thought desirable to give a name to this temperament or diathesis, as in algebra we employ a letter to represent an unknown quantity, it might properly be described as the *Diathesis spasmodica* or the *Neurosis spasmodica;* such names expressing very well an essential character of the temperament,—that is, the tendency to independent and spasmodic action on the part of the different nervous centres. There is, in fact, some inherent instability of nervous element, whereby the mutual reaction of the nerve-cells in the higher walks of nervous function does not properly take place, and due consent or co-ordination of function is replaced by irregular and purposeless independent reaction outwards: there is, as it were, a loss of the power of self-control in the individual nerve-cell, an inability of calm self-contained activity, subordinate or co-ordinate, and its energy is dissipated in an explosive display, which, like the impulsive action of the passionate man, surely denotes an irritable weakness. Here, as elsewhere, co-ordination of function signifies power, innate or acquired, and marks exaltation of organic development.

Is it not very plain how impossible it is to do full justice to any individual, sane or insane, by considering him as an isolated fact? Beneath his conscious activity and reflection there lies the unconscious inborn nature which all unawares mingles continually in the events of life—the spontaneity whence spring the sources of desire and the impulses of action; for the conscious and the unconscious, like warp and woof, together constitute the texture of life. No one, be he ever so cunning in dissimulation or crafty in reticence, can conceal or misrepresent himself; in spite of art his real nature reveals itself in every movement of the part which he plays, in every pulsation of his life. The inborn nature constitutes the foundation upon which all the acquisitions of development must rest, the substratum in which fundamentally all conscious mental phenomena are rooted. When it is radically defective, no amount of systematic labour will avail to counterbalance entirely the defect: it were as hopeless to attempt to rear the massive structure of a royal palace upon foundations dug only for a cottage as to impose the superstructure of a large, vigorous, and complete culture upon the rotten foundations which an inherited taint of nervous element implies; something will always be wanting, some crack in the building will show the instability of the foundations, even when the whole structure does not fall "in ruin hurled." Any mental philosophy which takes no notice of the foundations of the character, but ignores the important individual differences of nature, does not truly reflect the facts, and cannot fail to be a provisional and transitory system. It is guilty, in fact, of the same error as that into which an introspective psychology falls, when, isolating the particular state of mind, and neglecting the antecedent conditions upon which it has followed, it pronounces the will to be free; by isolating the individual, and forgetting that he is but a link in the long chain of nature's organic evolution, it transforms him into an abstract and impossible entity, and often judges his actions with a most unjust judgment.

2. *Quantity and Quality of the Blood.*—The grey centres of the brain, and especially the cortical layers of the hemispheres, are well known to be richly supplied with blood-vessels, even when comparison is made with the notably abundant supply of the spinal centres. The ideational cells demand for the due exercise of their functions a rapid renewal of arterial blood, and there is obviously an active interchange of some kind con-

tinually going on between the blood and the nervous elements. The quantity and quality of the blood, therefore, circulating through the supreme centres, must affect their functions in an important manner, especially as they are the most sensitive elements of the body in this regard. When the most skilful chemist is unable to detect anything unusual in the atmosphere of a room in which are many people, a delicate woman may get a headache and actually faint away. Send through the brain of any one blood charged with carbonic acid, and destiny could not doom him not to die; whilst a mixture of air and carbonic acid in certain proportions, inspired like chloroform, will, like it, act as an anæsthetic, paralysing consciousness.

When there is a rapid flow of healthy blood through the supreme cerebral centres, a quick interchange goes on between the nerve-cells and the blood, and the excitation and interaction of ideas proceed with great vivacity. The effect of active thought is to produce such a determination of blood, which in turn is the necessary condition of the continuance of the active function. But when a natural determination of blood degenerates into a greater or less stasis or congestion, as it may easily do when intellectual activity is too much prolonged, or when congestion is otherwise produced, then there is an inability to think, and confusion of thought, emotional depression and irritability, swimming in the head, disturbance of sight and of hearing, testify to a morbid condition of things. It is striking how completely a slight congestion of the brain may incapacitate for mental activity, and how entirely the strong man is prostrated thereby: an afflicting stagnation of ideas accompanies the stagnation of blood; and he, heretofore so strong and confident, realizes in vivid affright on how slight a thread hangs the whole fabric of his intellect. If the morbid state should, instead of remaining passive, or passing away altogether, become active, as it does when actual inflammation occurs, then the functional activity of the cerebral cells becomes most irregular and degenerate; the co-ordination of function which is maintained in health is lost, as that of the spinal cord is under like circumstances, and a wild and incoherent delirium witnesses to the independent and, if we might so speak, convulsive action of the different cells: the delirious ideas are the expression of a condition of things in the supreme centres which is the counterpart of that which in the spinal centres utters itself in spasmodic movements or convulsions. With the destruction of that co-ordination of function which volition implies the will is necessarily abolished; and such purposeless or dangerous acts as the delirious being executes are dictated by the morbid ideas that automatically arise. Some with inconsiderate haste speak of this degenerate activity in its earlier stages as increased mental activity, as they also speak of active inflammation as increased vital action; not otherwise than as if convulsions were accounted the sure signs of strength, or as if the tale of an idiot, because it is full of sound and fury, though signifying nothing, were the safe index of a high mental activity.

Since the time of Hippocrates it has been known that when there is too little blood in the brain symptoms are exhibited similar to those which are produced by a congestion of blood: pains and swimming in the head, confusion and incapacity of thought, affections of the senses and of movement, occur in consequence of anæmia of the brain as certainly as they do in consequence of congestion. In both cases the due nutrition of the nerve-cell, which is the agent of cerebral function, is greatly hindered; and much of the ill effect is similar though the cause appears to be so different. In reality, however, the causes are not so different when we proceed to analyse the conditions comprised under the terms anæmia and congestion. In that continued relation between the organic element and the blood by which the due reparative material is brought and waste matter carried away, it amounts to much the same thing whether through stasis of the blood the refuse is not carried off and reparative material brought to the spot where it is wanted, or whether the like result ensues by reason of a defective blood and deficient circulation: it is little matter to the inhabitants whether the street is almost blocked, or whether its entrance is almost closed, so long as free circulation is prevented.

Temporary irregularities in the supply of blood to the supreme nervous centres may, and often do, pass away without leaving any ill consequences behind them; but when they recur frequently, and become more lasting, their disappearance is by no means the disappearance of the entire evil: the effect has become a cause that continues in action after the original cause has been removed: and permanent mental disorder may be thus established. Once the habit of morbid action is fixed in a part, it continues as naturally as, under better auspices, the normal physiological action. It is ever, therefore, of the first importance to give timely heed to the earliest warning which morbid action gives; but it is of especial importance to do so in the case of organic element so exceedingly susceptible and so exquisitely delicate as is nervous element.

A perverted condition of the blood quickly exercises a marked effect upon the function of the supreme cerebral cells. The influence of alcohol upon the mental function furnishes the simplest instance in illustration of the action of a foreign matter introduced into the blood from without: here, where each phase of an artificially-produced insanity is successively passed through in a brief space of time, we have the abstract and brief chronicle of the history of insanity. The first effect of alcohol is to produce an agreeable excitement, a lively flow of ideas, and a general activity of mind—a condition not unlike that which sometimes precedes an attack of mania; then there follows, as in insanity, the automatic origination of ideas which start up and follow one another without order, so that more or less incoherence of thought and speech is exhibited, while at the same time passion is easily excited, which takes different forms, according to the individual temperament; after this stage has lasted for a time, in some longer, in others shorter, it passes into one of depression and maudlin melancholy, as convulsion passes into paralysis—the last scene of all being one of dementia and stupor. The different stages of mental disorder are compressed into a short period of time because the action of the poison is quick and transitory; we have only to spread the poisonous action over years, as the regular drunkard does, and we may get a chronic and enduring insanity in which the above described scenes are more slowly acted. Or if death cuts short the career of the individual, and puts a stop to the full development of the tragedy in his life, we may still not be disappointed at seeing it played out in the lives of his descendants; for the drunkenness of the parent sometimes observably becomes the insanity of the offspring, which thereupon, if not interfered with, goes through the course of degeneracy already described. It is worth while to take note here how differently alcohol affects different people according to their temperaments, ever bringing forward the unconscious real nature of the man: of one it makes a furious maniac for the time being; another it makes maudlin and melancholic; and a third under its influence is stupid and heavy from the beginning. So it is with insanity otherwise caused: the particular constitution or temperament, rather than the exciting cause of the disease, determines the form which the madness takes. An exact differential pathology would involve the knowledge of what constitutes individual temperament.

Many other poisons besides alcohol,—as opium, belladonna, Indian hemp,—stimulate and ultimately derange the function of the supreme cerebral cells. It is deserving of remark that the different nervous centres of the body manifest elective affinities for particular poisons: while the spinal centres have a special affinity for strychnine, the cerebral centres seem to be unaffected by it; belladonna, on the other hand, seems rather to depress spinal activity, but produces a great effect upon the centres of consciousness, giving rise at an early period of its action to delirium characterised by extreme delusions; and Indian hemp concentrates its action mainly on the sensory centres, exciting remarkable hallucinations. That medicinal substances do display these elective affinities is a proof, at any rate, that there are important though delicate differences in the constitution or composition of the different nervous centres, notwithstanding that we are unable to detect the nature of them. It may be also that there is shadowed out in these different effects of poisons on the nervous system a means which may ultimately be of use in the investigation of the constitution of the latter. Though the rapid recovery from their effects proves that the combination which they form with nerve element is temporary, it must be borne in mind with regard to them, as with regard to alcohol, that the nervous system, when repeatedly exposed to their poisonous influence, acquires a disposition to irregular or morbid action, even when they are not present; so that more or less delirium, hallucinations, and insanity are the results of their continued abuse—they are efficient to initiate a degeneracy which then proceeds of itself.

But the condition of the blood may be perverted by reason of something bred in it, or by reason of the retention in it of some substance which should rightly be excreted from it. Without any change whatsoever having taken place in his external relations, the presence of bile in his blood may drive any one to regard his surroundings and his future in the gloomiest light imaginable; he may know that a few hours ago things looked quite differently, and may believe that in a few hours more they will again have a different aspect, yet for the time being he is the victim of a humour which he cannot withstand. Philosophy is of no avail to him; for philosophy cannot remove that condition of nervous element which the impure blood has engendered, and which is the occasion of his gloomy feelings and painful conceptions. Carry this morbid state of nervous element to a further stage of degeneration, there ensues the genuine melancholia of insanity. In like manner the presence of some urinary product in the blood of a gouty patient gives rise to an irritability which no amount of mental control can remove, though it may succeed sometimes in repressing its manifestations. The mental tone being, as already set forth, the expression of a physical condition of nervous element, is beyond conscious determination, just as the delirium and convulsions of the patient dying from uræmic poisoning are beyond control. It can admit of no question that every degree of mental disorder, from the mildest feeling of melancholic depression to the extremest fury of delirium, may be due to the non-evacuation from the blood of the waste matters of the tissues; but as we know very little at present of the nature of those waste products of the retrograde metamorphosis, and of the different transformations which they undergo before they are eliminated, we must rest content with the general statement, and set ourselves in practice to prosecute rigorous inquiries into the particular instances. The irregularities of menstruation, which are so common in insanity, are of great importance in regard to this question: the return of the menses at their due season not unfrequently heralds recovery; and, on the other hand, severe exacerbations of epilepsy and insanity sometimes coincide with the menstrual period. In one case of a demented epileptic under my care, the fits always came on at the time of menstruation, and continued in severe form during the progress of that function; but there were commonly no fits in the intervals: on the other hand, many cases are on record, more or less like that well-known one related by Esquirol, where an insane girl, whose menses had ceased for some time, recovered her senses directly they began to flow.

When we reflect that the blood is itself a living, developing fluid, that,—"burnished with a living splendour," it circulates through the body, supplying the material for the nutrition of the various tissues, receiving again their waste matter and carrying it to those parts where it may either be appropriated and removed by nutrition or eliminated by secretion,—it is plain that multitudinous changes are continually taking place in its constitution and composition—that its existence is a continued metastasis. There is the widest possibility, therefore, of abnormal changes in some of the manifold processes of its complex life and function, such as may generate products injurious or fatal to the nutrition of the different tissues. The blood itself may not reach its proper growth and development by reason of some defect in the function of the glands that minister to its formation, or, carrying the cause still further back, by reason of wretched conditions of life; there is in consequence a defective nutrition generally, as in scrofulous persons, and the nervous system shares in the general delicacy of constitution, so that, though quickly impressible and lively in reaction, it is irritable, feeble, and easily exhausted. In the condition known as anæmia, we have an observable defect in the blood and palpable nervous suffering in consequence; headaches, giddiness, low spirits, and susceptibility to emotional excitement reveal the morbid effects. Poverty of blood, it can admit of no doubt, plays the same weighty part in the production of insanity as it does in the production of other nervous diseases, such as hysteria, chorea, neuralgia, and even epilepsy. The exhaustion produced by lactation is a well-recognised cause of mental derangement; and a great loss of blood during childbirth has sometimes been the cause of an outbreak of insanity. But while we can thus detect an evil so manifest as a great loss of blood or a deficiency of iron in the blood, there are good reasons to think that other graver defects in its constitution or development, of which we can give no account, do exist and give rise to secondary nervous degeneration. It is in this way probably that ill conditions of existence,—as overcrowding, bad air, insufficient food, intemperance,—lead to defects of nervous development, or to actual arrest thereof, and thus produce mental as well as physical deterioration of the race.

There is no want of evidence that organic morbid poisons, bred in the organism or in the blood itself, may act in the most baneful manner upon the supreme nervous centres. That these organic poisons do act in a definite manner on the organic elements, and give rise to definite morbid actions, is proved by the symptoms of such diseases as syphilis and small-pox. Now, the general laws observable in the actions of morbid poisons appear for the most part similar to those which govern the action of medicinal substances; and as the Woorara poison completely paralyses the nerves and does not affect the muscles, or as strychnia poisons the spinal centres, and leaves the cerebral centres unaffected, so it may be presumed that a particular organic virus may have a predominant affinity for a particular nervous centre, and work its mischievous work there. It is certain that in some states of the constitution an organic virus is generated in the blood, or elsewhere in the organism, which almost instantaneously proves fatal to the life of nervous element—which is, indeed, as surely, though not as quickly, fatal as a poisonous dose of prussic acid. With what marvellous destructive force certain morbid materials bred in the blood, or passing into it, may act, is shown, as Mr. Paget has pointed out, in certain cases of so-called putrid infection in which the patient dies after an injury or an operation before there has been time to feel the after-consequences, or in some cases of malignant typhus where the virus is directly fatal to nervous element before the fever has had time to develop itself. It is easily conceivable that a virus which produces fatal results when concentrated may, when acting with less intensity, give rise to nervous derangement which stops short of death. The syphilitic virus usually affects the nervous system more or less severely at one period or other of its action; but in some instances it appears to select the nervous system specially for its pernicious influence, or to concentrate its action upon it, so as to produce a hopeless insanity. There are cases on record, again, in which mental derangement has appeared as the intermittent symptoms of ague; instead of the usual symptoms the patient has had an intermittent insanity in regular tertian or quartan attacks, and has been cured by the treatment for intermittent fever.* Griesinger directs special attention to cases in which mental disorder has occurred in the course of acute rheumatism, the swelling of the joints meanwhile subsiding; and Arnold has known cases of people subject to frequent fits of gout who have had none while suffering from an attack of insanity. The viruses of acute fevers, as typhus and typhoid, may notably act in the most positive manner on the supreme nervous cells, giving rise to an active delirium or more or less enduring insanity; and where they do not act directly at the height of the fever, they still sometimes predispose to an outbreak of insanity during the decline of the acute disease. Not only may a morbid poison thus attack the nervous system, or a part of it, but it should be borne in mind that a particular virus will most likely produce its special effects, not otherwise than as tea and coffee commonly produce wakefulness while opium produces sleep.

The earliest and mildest mental effect by which a perverted state of blood declares itself is not in the production of positive delusion or of incoherence of thought, but in a modification of the mental *tone*. Feelings of discomfort or depression, of irritability or uneasiness, testify to some modification of the statical condition of nervous element; and a great disposition to emotional subjectivity is the psychical manifestation of this state. It may exist in different degrees of intensity, from the slight irritability or gloom which attends upon a sluggish liver, or the greater irritability which the urea in the blood of the gouty subject produces, to that profound depression which we describe as melancholia, or that active degeneration of function which we designate mania. Though there may be no active delusion, the emotional perversion existing by itself, yet the ideas which arise under such circumstances do not fail to feel the influence of the morbid feeling, but are strongly tinctured by it; they are obscure, or painful, or, at any rate, not faithfully representative of external circumstances. The morbid character of the depression lies, not in the depression itself, which would be natural or normal so long as there was an adequate external cause of it, but in its existence without any external cause, in the discord between the individual and his circumstances. But as there is an irresistible disposition in the mind to represent its feelings as qualities of the external object, as in all our mental life we continually make this projection outwards of our subjective states, it commonly happens after a while that the victim of an internally-caused emotional perversion seeks for an objective cause of it, and, thinking to find one, gets a delusion: being in a discord with the external, he establishes an equilibrium between himself and it by creation of a surrounding in harmony with his inner life. The form which the delusion takes may be a natural crystallization or condensation, so to speak, of the particular morbid emotion which prevails, or it may be suggested, as it often is, by some prominent external event. What we have to bear in mind with regard to the organic nature of the delusion is, that a series of ideational cells have now entered upon the habit of a definite morbid action; that the general commotion of nerve element, which the emotional disturbance implied, has now centred in a particular *form* of diseased action, not otherwise than as general inflammatory disturbance of some part of the organism issues in a definite morbid growth there. For although a temporary emotional disturbance produced by bad blood may completely pass away with the purification of the blood, yet the prolonged continuance or frequent recurrence of such morbid influence will inevitably end in the ideational nerve-cell, as elsewhere, in chronic morbid action, which, once established, is not easily got rid of. Thus, then, it appears that the first effect of the chronic action of impure blood is to produce a general disturbance of the psychical tone or indefinite morbid emotion ; and the further effect of its continued action is to engender a chronic delusion of some kind—a systematization of the morbid action. But a third effect of its more acute action, as witnessed in the effects of acute fevers and of certain poisons, is to produce more or less active delirium and general incoherence of thought : the poison is distributed generally through the supreme centres by the circulation, and, acting directly upon the different cells, excites ideas rapidly and without order or coherence : the delirium is not systematic, and there is good hope of its passing away. A general incoherence equally unsystematized, but which never can pass away save with life itself, is the natural issue of long-continued chronic morbid action in the supreme centres : it is the chronic dementia following continued insanity, and marking mental disorganization. I mention it here in order to render pathologically intelligible the very different prognosis in acute dementia from that in chronic dementia.

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* A young man in an agueish district suffered from five brief attacks of mental derangement, one occurring every other day. The attacks began with an indescribable feeling of pain in the region of the heart, and with strong pulsations of the heart. This was the starting point of the delirium, from which the patient recovered after a deep sleep. He was cured by quinine.——A strong peasant, aged 30, who had never had ague though he lived in an agueish district, was suddenly attacked with insanity. He believed himself to be Jesus Christ, and those near him to be witches, and acted with violence towards them. His head was hot; his eyes were red and wild; his pulse was quick and his tongue white. After cupping and the application of ice to the head, he recovered, and for two days remained quite sound in mind. On the fourth day however, exactly at the same time, he had a similar attack, and again a third, after three days more. He was cured by quinine.—*Die Pathologie und Therapie der psychischen Krankheiten.* Von Dr. W. Griesinger.

It is before all things necessary to keep stedfastly in view that the relation between the supreme nervous centres and the blood is fundamentally of the same kind as that between other parts of the body and their blood supply, and that the disordered mental phenomena are the functional indications of morbid organic action. Firmly grasping this just conception, as we may do by calling to mind the mode of nutritive action in other parts of the body, we get rid of the notion of a delusion as some abstract, ideal, and incomprehensible entity, and recognise it as the definite expression of a certain form of morbid action in certain of the supreme centres, neither more nor less wonderful than the persistence of a definite morbid action in any other organ. If there is defective or disordered nutrition of the brain, and some striking event or some powerful shock produces a great impression on the mind, constraining it into a particular form of activity—in other words, engrossing its whole energy in a particular gloomy reflection, what more in accordance with analogy than that this should take on a chronic morbid action, and issue in the production of a delusion? Any great passion in the sound mind notably calls up kindred ideas, which thereupon tend to keep it up ; and it is plain that the morbid exaggeration of this natural process must lead to the production of delusion.

3. *Reflex Irritation.*—Like every other nervous centre, or like any other part of the organism, the supreme cells of the ideational centres may be deranged by reason of a morbid cause of irritation in some other part of the body. Why such morbid effect should be produced at one time and not at another, or in one person and not in another, it is impossible to say, just as it is impossible to explain how it is that a wound in the hand or elsewhere at one time gives rise to tetanus and at another time to no such desperate consequence, or why epilepsy should be caused by an eccentric irritation in one case and not in another. "A fever, delirium, and violent convulsions," says Dr. Whytt, "have been produced by a pin sticking in the coats of the stomach; and worms affecting either this part or the intestines occasion a surprising variety of symptoms."* These effects were of old attributed to a *sympathy* or *consent* of parts, terms which were, though equally void of any real explanation, quite as expressive as the modern *reflex irritation.*

Amongst many other instances which might be quoted in illustration of this manner of pathological action, a case recorded by Baron Larrey is a striking example. A soldier, who had been shot in the abdomen, had a fistulous opening on the right side, which passed inwards and towards the left. When a sound was introduced into this opening and made to touch the deeper parts, immediately singular attacks supervened: first there was a feeling of coldness and oppressive pain, then a convulsive contraction of the abdomen and spasm of the limbs; after which the man fell into a sort of somnambulism, and talked incoherently, this stage ending after about thirty minutes in a melancholy depression which from the time of the wound had been habitual. Larrey attributed the hypochondria and other nervous symptoms to the injury which the cœliac axis had suffered from the ball. The direct effect of the sympathetic system upon the brain, which this case so strikingly illustrates, Schroeder van der Kolk once verified in his own experience.† After great mental exertion and an unaccustomed constipation of a few days, he was attacked with a fever, for which his physician, deeming it nervous, would not sanction any purging. After a continuance of the fever for two days, hallucinations of vision occurred; he saw a multitude of people around him, although quite conscious that they were only phantasms. These continued for three days and increased, until he got a thorough evacuation of a quantity of hardened fæces from his bowels, when all the morbid phenomena vanished in a moment. A man who came under my observation, having suffered for more than a year with profound melancholia, and who had become greatly emaciated, passing at intervals pieces of tape-worm, recovered almost immediately after the expulsion of the whole of the worm by means of a dose of the oil of male fern.* Many like cases are on record in medical books; but it is not necessary to multiply instances in order to prove that morbid action in some part or organ of the body may be the cause of secondary functional and organic disorder of the supreme nervous centres. It may be well to add, however, that affections of the uterus and its appendages afford notable examples of a powerful sympathetic action upon the brain, and not unfrequently play an important part in the production of insanity, especially of melancholia. M. Azam investigated the histories of seven cases of lypemania with suicidal tendencies, of one case of simple lypemania with dangerous tendencies, and of one case of hysteromania. There were granulations of the neck of the uterus in five cases; there was anteversion of the uterus, with congestion of its neck and ulceration of the inferior lip, in one case; in three cases there were fungous and fibrous growths of the uterus; and in one case there was painful engorgement of it with leucorrhœa. Schroeder van der Kolk relates the case of a woman profoundly melancholic, who suffered at the same time from prolapsus uteri, and in whom the melancholia used to disappear directly the uterus was restored to its proper place; Flemming relates two similar cases in which the melancholia was cured by the use of a pessary, in one of them regularly returning whenever the pessary was removed; and I have in one instance seen severe melancholia of two years' duration disappear after the cure of a prolapsus uteri. Instances are on record in which a woman has regularly become insane during each pregnancy; and, on the other hand, Guislain and Griesinger mention a case respectively in which insanity disappeared during pregnancy, the patient at that time only being rational.* These are striking examples of a mode of reflex action which is a continual function of the organic life both in health and in disease. Perhaps the best opportunity of studying the early stages in the genesis of melancholia is afforded by the mental depression that commonly accompanies certain uterine diseases. On the other hand, there is equally striking evidence of this intimate sympathy of parts in the fact that morbid states of organs favouring a certain mental disposition may unquestionably be in turn caused by the latter when it is primary and of long standing.

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* Observations on the Nature, Causes, and Cure of Nervous Hypochondriacal or Hysteric Orders. By Robert Whytt, M.D. 1765.

† Die Pathologie und Therapie der Geisteskrankheiten auf Anatomisch-Physiologischer Grundlage. Von J. L. C. Schroeder van der Kolk. 1863.

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* Griesinger has seen deep melancholia arise in an hysterical woman after accidental wound of the eye by a splinter. Herzog relates an instance of insanity after the operation for strabismus. Jördens tells of a boy who was attacked with furious insanity in consequence of a splinter of glass in the sole of his foot, which disappeared directly it was removed.—*Op. cit.*, p. 183.

Perhaps the most instructive example of the intimate organic sympathy of parts is afforded by the great mental revolution which accompanies the development of the sexual system at puberty—when there occurs, as Goethe aptly expresses it, "an awakening of sensual impulses which clothe themselves in mental forms, of mental necessities which clothe themselves in sensual images." The great moral commotion produced at this period is the cause of an unstable equilibrium of mind, which, if hereditary predisposition exist, may, without further auxiliary cause, issue in insanity. In any case it constitutes a frame of mind favourable to the action of other causes of mental derangement.

It is uncertain whether the puerperal state acts as the occasional cause of a maniacal outbreak by this kind of sympathetic action, or whether it acts in some other way; but there can be no doubt of the fact that a woman is sometimes attacked with mental alienation during delivery, and that her child may fall a victim to her frenzy. This form of puerperal insanity is different in regard of causation from that which occurs a few days after delivery, and which is then probably due to blood-poisoning; and more different still from that mental disorder occurring some weeks or months after, and due seemingly to the exhaustion produced by lactation, together with depressing moral influences.

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* Shenck relates the history of a pregnant female, in whom the sight of the bare arm of a baker excited so great a desire to bite and devour it, that she compelled her husband to offer money to the baker to allow her only a bite or two from his arm. He mentions another pregnant female, who had such an urgent desire to eat the flesh of her husband, that she killed him and pickled the flesh, that it might serve for several banquets.—Prochaska on the *Nervous System*, Syd. Soc. translation.

The earliest and mildest effect of sympathetic morbid action will be, as it is with the effect of vitiated blood, to produce a modification of the *tone* of nervous element, which is functionally manifest in disordered emotion. But the continued operation of the morbid cause will be apt to lead to a systematized disorder in the supreme cerebral centres: in other words, to the production of a delusion or of a definite derangement of thought, which then is not always without discoverable relation to the primary morbid cause. When, for example, a woman with morbid irritation of the sexual organs has salacious delusions, or with uterine or ovarian disease believes herself with child by the Holy Ghost or other supernatural means, the secondary derangement of the cerebral centres testifies to the special effect of the particular diseased organ; and when the disordered action forces itself into consciousness, the interpretation given of it in the delusion witnesses to the nature of the primary morbid cause. There is the most perfect harmony, the most intimate connexion or sympathy, between the different organs of the body as the expression of its organic life—a unity of the organism beneath consciousness; and the brain is quite aware that the body has a liver or a stomach, and feels the effects of disorder in any one of the organs, without declaring it directly in consciousness. This unconscious, but not unimportant, cerebral activity, which is the expression of the organic sympathies of the brain, cannot fail, when rightly appreciated, to teach the lesson, already much insisted on, that every organic motion, visible or invisible, sensible or insensible, ministrant to the noblest purposes or to the humblest aims, does not pass away issueless, but has its due effect upon the whole, and thrills throughout the most complex recesses of the mental life.*

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* "Man is all symmetric,
Full of proportion one limb to another,
And all to all the world besides,
Each part calls the furthest brother.
For head with foot hath private amity,
And both with moon and tides."—*George Herbert.*

Though the morbid sympathetic action of a diseased organ upon the brain may be very considerable without any definite affection of consciousness, yet when it reaches a certain intensity, or when it is long continued, the effect thrusts itself into consciousness, just as physiologically the idea does when its energy reaches a certain tension—declaring itself in the sensational centres by pain or some more special anomalous feeling, and in the cognitional centres by emotional perversion or actual delusion. It often happens that no information is given until the primary and secondary mischief are far advanced, and it is then only given indirectly; for while there is entire unconsciousness of the primary disease in the distant organ, and an entire unconsciousness of the secondary morbid action in the brain, the effect may nevertheless be positively attested by melancholia, delusion, or some other form of mental disorder. Esquirol graphically tells the story of a woman who thought she had in her belly the whole tribe of apostles, prophets, and martyrs, and who, when her pains were more than usual, railed at them for their greater activity. After death, her intestines were found glued together by a chronic peritonitis. I have recently seen a patient suffering from chronic insanity, who fancies that he has got a man in his inside, and who, when his bowels get much constipated, as they are apt to do, makes the most desperate attempts, by vomiting and otherwise, to get rid of him. After a purgative, however, he is quite comfortable for a time, and his delusion subsides into the background. In the insanity attended with phthisis there are often delusions of suspicion which appear to have their foundation in the anomalous feeling incident to the advance of the tubercle: one such patient under my care fancied that he was maliciously played upon by secret fire, interpreting in this way the actual increase of bodily temperature which occurs during the progress of phthisis; he also imagined that a filthy disease had been produced in his mouth, the delusion probably having its origin in the perversion of smell or taste resulting from the disease. Not only is the remote pathological effect of a diseased organ thus evinced by the occurrence of some form of insanity, but, as already pointed out, a *special* effect of the *particular* morbid organ may be revealed in the character of the delusion engendered. It is by virtue of this sympathetic action that dreams sometimes have a truly prophetic character in regard of certain bodily affections, the early indications of which have not been sufficiently marked to awaken any attention during the mental activity of the day, or to do more than produce an obscure and formless feeling of discomfort, but which nevertheless declare themselves in the mental action of dreaming, when other impressions are shut out. When the disease ultimately declares itself distinctly in our waking consciousness, then the prophetic dream, the forewarning, is recalled to mind with wonder. After all, however, the most striking examples of this kind of action in its physiological form are met with in the marvellous creations of dreams originating in states of the sexual organs*—"tensio phalli visâ muliere nudâ etiam in insomnio"—these illustrating admirably the close sympathy which prevails; while numerous examples of this kind of action in its pathological form are furnished by the salacious delusions of certain of the insane in whom there is derangement of the sexual system. In every large asylum are to be met women who believe themselves to be visited every night by their lovers, or violently ravished in their sleep; and in some of these, as in St. Catherine de Sienne and St. Theresa, a religious ecstasy is united with their salacious delusions. Indeed, a religious fanaticism carried to a morbid degree is not seldom accompanied by a corresponding morbid lewdness; while religious feeling of a less extreme kind in some women, especially certain unmarried and childless women, is very much a uterine affection.

Between the organic feelings just considered, the *vital* senses, as they are sometimes called, and the lower *special* senses, there exist the closest relations; in truth, they run insensibly into one another. Thus the digestive organs have the closest sympathy with the sense of taste, as we observe in the bad taste accompanying indigestion, and especially perhaps in the avoidance of poisonous matters by animals; the respiratory organs and the sense of smell are in like manner intimately associated; and the sense of touch has close relations with the cœnæsthesis. In insanity we find these physiological relations become sometimes the occasions of delusions: derangement of the digestive organs, perverting the taste, gives rise to the delusion that the food is poisoned; disease in the respiratory organs is sometimes the cause of disagreeable subjective smells, which are thereupon attributed to an objective cause, such as the presence of a dead body in the room; and more or less loss or perversion of sensibility in the skin, which is not uncommon amongst the insane, is frequently the occasion of extravagant delusions. A woman whose case Esquirol tells, had complete anæsthesia of the surface of the skin: she believed that the devil had carried off her body. A soldier who was severely wounded at the battle of Austerlitz considered himself dead from that time: if he were asked how he was, he invariably replied, that "Lambert no longer lives; a cannon-ball carried him away at Austerlitz. What you see here is not Lambert, but a badly imitated machine,"—which he failed not to speak of as *it*. The sensibility of his skin was lost. A striking instance of delusion in connexion with defective sensibility occurred in an amiable and amusing patient who was under my care suffering from general paralysis. As the disease approached its end, the end of life, he had severe epileptiform convulsions, which latterly affected the left side only, and finally resulted in paralysis of that side. But, though the power of movement and feeling were entirely gone, there were frequent spasmodic twitchings of the muscles and convulsive contractions so strong as to raise the arm and leg of the paralysed side from the bed. The poor man had the most singular delusions in regard to these movements: he thought that another patient, who was perfectly demented and harmless, had got hold of him and was tormenting him, and accordingly, without real anger, but with an energy of language that was habitual to him, he thus soliloquized aloud:—"What a power that damned fellow has over me!" Then after a severe convulsion,—"He has got me round the neck, and you dare not touch him, not one of you. Oh! but it is a burning shame to let a poor fellow be murdered in this way in a public institution. It's that boy does this to me." Told that he was mistaken, he replied,—"You may as well call me a liar at once: he has got me round the neck and he has me tight. Oh! it is a damned shame to treat me in this way—the quietest man in the house." Then after a while,—

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* "And as love and beauty stir up heat in other organs, so heat in the same organs, from whatever it proceeds, often causeth desire and the image of an unresisting beauty."—*Hobbes.*

"It's a strange power these lunatics have over one. That boy is playing the devil with me: he stinks worse than a polecat: he'll take my life, sure enough." And so on continually, until the stupor of death overpowered him.

Laudably anxious to give due weight to defects of sensibility in insanity, Griesinger has made five groups of mental disorder connected with different anomalies of sensibility, and more frequently than not actually dependent upon them. The first of these is the *præcordial form*, where there are morbid sensation, sense of pressure, or pain about the epigastrium, from which follow fear and mental anguish, with corresponding ideas and habits of thought. The second is the *vertiginous form*, in which some anomaly of muscular sensibility exists. In the third, which he calls the *paræsthetical form*, there are anomalous sensations in different parts of the body, attributed by the patients commonly to external machinations. The fourth is the *anæsthetic form*, in which absence of sensibility is often the cause of self-mutilation. Lastly, there is the *hallucinatory form*, which obviously needs no explanation here. All that it seems important to say further is, that these pathological phenomena confirm in a striking manner the observations made in the First Part of this work concerning the comprehension in the mental life of the whole bodily life.

The centre of morbid irritation which is so apt at times to give rise to secondary disorder by reflex or sympathetic action need not be in some distant organ; it may be in the brain itself. A tumour, abscess, or local softening in the brain, may nowise interfere with the mental operations at one time, while at another time it produces the gravest disorder of them; and it is not uncommon in abscess of the brain for the symptoms of mental derangement, when there are any, to disappear entirely for a time, and then to return suddenly in all their gravity. When the motor, sensory, and ideational centres are not directly implicated in the disease, they may continue their functions in spite of it, and it does accordingly happen that they sometimes do so even when there is the most serious mischief going on in the brain; but they may at any moment be affected by a sympathetic or reflex action, and a secondary abolition or derangement of function thus supervene without warning.

Instances now and then occur in which a sudden loss of consciousness, or a sudden incoherence, or sudden mania, or even sudden death, takes place where no premonitory symptoms have indicated grave local disease of the brain.

Furthermore it would appear that a limited disorder of the ideational cells, such as is functionally manifest in the fixed delusions of the so-called monomaniac, will not usually remain without some effect upon the other elements in the supreme centres. So delicately sympathetic and sensitive as nerve element is, it is hard to conceive it possible that a centre of morbid action should not, by direct or by reflex action, affect neighbouring parts not immediately involved in the disease. As a matter of observation it is certain that a greater or less disturbance of the *tone* of the whole mind does commonly accompany the limited delusions of a partial insanity; in fact, the condition of things is that which has already been described as the first stage of the affection of mind by other causes of its derangement, namely, a modification of the mental *tone*. This baneful effect of a limited local disorder is in strict accordance with the analogy of what we observe elsewhere. Hereafter we shall have occasion to describe instances of the sudden and entire transference of active disorder of one nervous centre to another; for, as Dr. Darwin long ago observed, "in some convulsive diseases a delirium or insanity supervenes and the convulsions cease; and, conversely, the convulsions shall supervene and the delirium cease."

It is necessary here, as in the spinal, sensory, and motor centres, to distinguish between the degrees of secondary pathological disturbance to which a morbid cause may give rise. The sudden way in which extreme mental symptoms appear, and the equally sudden way in which they sometimes disappear, as in abscess of the brain, prove that extreme derangement may be what is called functional; for it is impossible to suppose that serious organic change has existed in such cases. Although, therefore, the functional disorder necessarily implies a molecular change of some kind in the nervous element, the change may be assumed to be one affecting the polar molecules, such as the experiments of Du Bois Reymond and others have proved may rapidly appear and rapidly disappear. The induction of recognisable temporary changes in the physical constitution and function by experiments certainly warrants the belief in similar modifications by causes which are not artificially produced, but which are just as abnormal as if they were artificial. This probable modification of the polar relations of nervous element, which disappears with the removal of the cause, will not fail, if too great or too prolonged, to degenerate into actual nutritive change and structural disease, just as an emotion which observably often alters a secretion temporarily may, when long enduring, lead to actual nutritive change in the organ. The longer a functional derangement is allowed to continue, the more danger is there of structural disease; and this serious change once definitely established, the removal of the primary morbid cause will not suffice to remove an effect which has now become an independently acting cause.

4. *Excessive Functional Activity.*—As the manifestation of function is the waste of matter, it is obvious that, if the due intervals of periodical rest be not allowed for the restoration of the statical equilibrium of nervous element, degeneration of it must take place as surely as if it were directly injured by a morbid poison or a mechanical or chemical irritant. It is sleep which thus knits up the ravelled structure of nervous element; for, during sleep, organic assimilation is restoring as statical force the power which has been expended in functional energy. The strongest mind, if continually overworked, will inevitably break down; and one of the first symptoms that foreshadows the coming mischief is sleeplessness. That which should heal the breach is rendered impossible by the extent of the breach. Like Hamlet, according to Polonius's fruitful imagination, the individual falls into a sadness, thence into a watch, thence into a lightness, and, by this declension, into the madness wherein he finally raves. To provoke repose in him is the first condition of restoration; the power of it often closing the "eye of anguish," and curing the "great breach in the abused nature" of nervous element.

It is, however, when intellectual activity is accompanied with great emotional agitation that it is most enervating—when the mind is the theatre of great passions that its energy is soonest exhausted. What has already been said as to the instability of nervous element which a great emotional aptitude implies, will enable us to understand how this destructive effect is worked out. When an exceedingly painful event produces great sorrow, or a critical and uncertain event great anxiety, the mind is undergoing a passion or suffering; there is not an equilibrium between the internal life and the external circumstances; and until the mind is able duly to react, the passion must continue, or, in other words, the wear and tear of nervous element must go on. Painful emotion is in reality *psychical pain;* and pain here, as elsewhere, is the outcry of suffering organic element—a prayer for deliverance and rest. The same objects or events do notably produce very different impressions upon the mind according to the condition of it at the time—according as something pleasant or something unpleasant has just happened. If there exist a temporary depression of the psychical tone by reason of some misfortune that has happened, then an event, which under better auspices would have been indifferent, will excite painful emotion, and, calling up congenial ideas of a gloomy kind, continue and add to the mental suffering, just as reflex action increased by a morbid cause will in turn sometimes aggravate the original disorder. If there be a lasting depression of the psychical tone by reason of some morbid cause, then every event is apt to aggravate the suffering, and one particularly unfavourable event, or a series of painful events, may lead to the degeneration of insanity. After a piece of good news, or after a man has just drunk a glass of sound wine, the psychical tone is such that there is a direct and adequate reaction to an unfavourable impression, and the individual will not suffer. Herein the supreme centres of thought do not differ from the inferior nervous centres; when the spinal centres are exhausted, excitability is increased, and an impression which under better auspices would have produced no effect gives rise to degenerate activity that displays itself in spasmodic movements—an explosion not unlike that which in the higher centre is manifest as emotion, or as an ebullition of passion. Excess is, however, a relative term; and a stress of function which would be nothing more than normal to a powerful well-ordered mind, and conducive to its health, might be fatal to the stability of a feeble and ill-regulated mind in which feeling habitually overswayed reason, or even to that of a strong mind temporarily prostrate. Thus it is that in examining into the causation of insanity in any case it is not sufficient to investigate only the series of influences to which the individual has been subjected, but it is necessary also to ascertain what capacity at the time he had of bearing them.

It is evident from the foregoing reflections that, from a pathological point of view, the so-called *moral* causes of insanity may properly fall under the head of excessive stimulation or excessive functional action: the mind is subject to a stress beyond what it is able to bear. Of necessity the depressing passions are the most efficient causes of exhaustion and consequent disease: grief, religious anxiety, disappointed affection or ambition, the wounds of an exaggerated self-love, and, above all perhaps, the painful feeling of being unequal to responsibilities, or other like conditions of mental agitation and suffering, are most apt to reach a violence of action by which the equilibrium is lost. It is especially when the individual has by a long concentration of thought, affection, and desire on a certain aim or object, grown into definite relations with regard to it, and made it, as it were, a part of the inner life, that a sudden and entire change, shattering long cherished hopes, is most likely to produce insanity; for what is more fraught with danger to the stability of the strongest mind than a sudden great change in external circumstances, without the inner life having been gradually adapted thereto? Thence it comes that a great exaltation of fortune, as well as a great affliction, rarely fails to affect for a time the strongest head, and sometimes quite overturns a weak one the strong mind succeeding after a time in establishing an equilibrium between itself and its new surroundings, which the feeble mind cannot do. When depressing passion does not act directly as the cause of a sudden outbreak of insanity, it may still act mischievously by its long-continued evil influence on the organic life, and thus finally produce mental derangement. It is not often that men become insane, though they sometimes die, from excess of joy; and when one of the expansive passions, as ambition, religious exaltation, overweening vanity in any of its Protean forms, leads to mental derangement, it does not, like a painful passion, act directly as the cause of an outbreak, or indirectly by producing organic disorder and subsequent insanity; but it exhibits its effects slowly as a gradual development or exaggeration of a particular vice of character.

A fatal drain upon the vitality of the higher nervous centres may in certain cases be produced by the excessive exercise of a physical function—by an excessive sexual indulgence, or by continued self-abuse. Nothing is more certain than that either of these causes will produce an enervation of nervous element which, if the exhausting vice be continued, passes by a further declension into degeneration and actual destruction thereof. The flying pains and heaviness in the limbs, and the startings of the muscles, which follow an occasional sexual excess, are signs of instability of nervous element in the spinal centres, which, if the cause is in continual operation, may end in inflammation and softening of the cord, and consequent paralysis. Nor do the supreme centres always escape: the habit of self-abuse notably gives rise to a particular and disagreeable form of insanity, characterised by intense self-feeling and conceit, extreme perversion of feeling, and corresponding derangement of thought, in the earlier stages; and, later, by failure of intelligence, nocturnal hallucinations, and suicidal or homicidal propensities. The mental symptoms of general paralysis—a disease notably produced sometimes by sexual excess—betray a degenerate condition of nerve element in the higher centres, which is the counterpart of that which in the lower centres is the cause of the loss of co-ordination of movement and of more or less spasm or paralysis. The great emotional excitability, the irritable feebleness, of the general paralytic, no less than the extravagance of his ideas, marks a degeneration of the ideational cells of the supreme centres; there is accordingly an inability to co-ordinate and perform his ideas successfully, just as there is an inability to perform movements successfully, because the spinal centres are similarly affected.

5. *Injuries of the Brain and Disease of the Brain not necessarily, but occasionally, producing Insanity.*—Injuries of the head, when not followed by immediate ill consequences, may still lead to insanity through the degenerative changes which they ultimately induce in the cortical layers of the hemispheres.* Inso-

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* Professor Schlager, of Vienna (Zeitschrift der k. k. Gesellschaft der Aerzte zu

lation notably acts perniciously on the supreme cerebral centres, either by causing, as some imagine, acute hyperæmia and œdema, or, as is more probable, over-stimulation and consequent exhaustion of nervous element. Abscesses and tumours of the brain, cysticerci and effusions of blood, do not directly or commonly produce mental derangement; when they do, it is probably by a reflex or sympathetic action. Professor Gerhardt mentions one case in which mental disorder was the first symptom of an embolism, the paralytic phenomena following later; and in a case, related by Dr. L. Meyer, chronic tubercular meningitis gave rise to mental disorder. It has been already said that there are instances on record in which insanity, like tetanus, has been caused by peripheric injury of nerve, obscure as the manner of operation in such case undoubtedly is; and Dr. Darwin long ago made the observation that mental derangement sometimes occurs as the transference of disorder from the spinal centres.

The caries of the bones of the skull, which is an occasional effect of tertiary syphilis, may lead to destructive consequences by extension of morbid action to important parts beneath. There are, however, other ways in which syphilis is now known to lead sometimes to mental disorder: a syphilitic node formed on the internal surface of the skull may lead to secondary mental disease of a grave kind; and, again, syphilis may give rise to inflammation of the membranes of the brain, followed sometimes by a low diffuse exudation in or between the membranes, or by a more or less defined tumour (*syphiloma*); the result being a hopeless dementia, with gradually increasing paralysis. The syphilitic exudation sometimes, though rarely, takes place in the substance of the brain itself; its starting-point then being the nuclei of

Wien, xiii. 1857), has made some valuable researches regarding mental disorder following injury of the brain. Out of 500 insane, he traced mental disorder to injury of the brain in 49 (42 men and 7 women). In 21 cases there had been complete unconsciousness after the accident; in 16, some insensibility and confusion of ideas; in 12, simple dull headache. In 19 cases the mental disorder came on in the course of a year after the injury, but not till much later in many others, and in 4 cases after more than ten years. In most of the cases the patients were disposed to congestion of the brain and emotional disturbance, from the time of the injury, on taking a moderate quantity of spirituous liquor; frequently there was singing in the ears or difficulty of hearing; and very commonly the disposition was changed, and the patient was prone to outbursts of anger or excesses. The prognosis was very unfavourable; the issue in 7 cases was dementia with paralysis, while 10 went on to death.

the connective tissue which exists throughout the brain, and the destruction of the nervous cells being secondary. But of this, more hereafter.

CONCLUDING REMARKS.

An important, but obscure question, of which little thought is ever taken now, is not so much what is the cause of the insanity as what is the cause of the particular form which the insanity takes. The inborn temperament of the individual has certainly great influence in determining the kind of mental disorder, the same external cause giving rise to different forms of disease according to the constitutional idiosyncrasy: the melancholic temperament will, it may be presumed, predispose to melancholic insanity, the sanguine temperament to a more expansive derangement. On the other hand, injury of the head will tend to produce intellectual disorder rather than emotional depression, while abdominal disease will rather favour the production of emotional depression; for the organic conditions of the integrity of the intellectual faculties are, as Müller has observed, mainly in the brain itself, but "the elements which maintain the emotions or strivings of self, in all parts of the organism." Furthermore, it is plain that the degree of development which the mind has reached must determine in no slight measure the features of its disorder; the more cultivated the mind the more various and complex must be the symptoms of its derangement; while it is not possible that the undeveloped mind of the child immediately after birth should exhibit ideational disorder of any kind. Consider what an infinitely complex development the cultivated mind has been shown to be, and what a long series of processes and what a variety of interworkings of so-called faculties even its simpler conceptions imply; it will then be easily understood how great and varied may be the confusion and disorder of its morbid action. The different forms of insanity represent different phases of mental degeneration; and in the disorganization, degeneration, or retrograde metamorphosis of the mental organization—call the retrograde change what we will—there will be exhibited the wreck of culture. The morbid mental phenomena of an insane Australian savage will of necessity be different from the morbid mental phenomena of an insane European, just as the ruins of a palace must be vaster and more varied than the ruins of a log hut. For the same reason the insanity of early life always has more or less of the character of imbecility or idiocy about it: as is the height so is the depth, as is the development so is the degeneration. The development of the sexual system at puberty, and the great revolution which is thereby effected in the mental life, must needs often give a colour to the phenomena of insanity occurring after puberty. During the energy of mental function in active manhood mania is the form of degeneration which appears most frequently to occur, while as age advances and energy declines melancholia becomes more common.

Because no two people are exactly alike in mental character and development, therefore no two cases of mental degeneration are exactly alike. The brain is different in the matter of its development from other organs of the body; for while the development and function of other organs are nearly alike in different individuals, and the diseases of them accordingly have a general resemblance, the real development of the brain as the organ of mental life only takes place after birth, and, presenting every variety of individual function in health, presents also every variety of morbid function: consequently, two cases of insanity may resemble one another in the general features of exaltation or depression, or in the character of the delusion, but will still have their special features. Insanity is not any fixed morbid entity; every instance of it is an example of individual degeneration, and represents individual mental life under other conditions than those which we agree to regard as normal or typical. No more useful work could be undertaken in psychology than an exact study of *individual* minds, sound and unsound.

Weigh carefully the manner of its causation, and it will appear that mental derangement must be a matter of degree. There may be every variety (*a*) of deficient original capacity, (*b*) of deficient development of the mental organization after birth, and (*c*) of degree of degeneration. Between the extremest cases of madness, therefore, and the highest level of mental soundness, there will be infinite varieties shading insensibly one into another; so that no man will be able to say positively where sanity ends and insanity begins, or to determine with certainty in every case whether a particular person is insane or not. The question of an individual's responsibility must then plainly be a most difficult one: there are insane persons who are certainly responsible for what they do, and, on the other hand, there are sane people who under certain circumstances are as plainly not responsible for their actions. A madman is notably capable of great self-control when his interest specially demands it; in the majority of cases he knows full well the difference between right and wrong; but, knowing the right, he is instigated by the impulses of his morbid nature to do the wrong, and is not held in check by those motives which suffice to restrain the sane portion of the community.

Again, the investigation made into the causation of mental disease exhibits the necessity of taking wider views of its origin and import than is commonly done. Insanity marks a failure in organic adaptation to external nature: it is the result and evidence of a discord between the man and his surroundings: he cannot bend circumstances to himself nor accommodate himself to circumstances. Now, whosoever either from inherited weakness of nature or from adverse circumstances is unequal to the predetermined impulse or *nisus* of evolution which is immanent in mankind, as in every other form of organic life, must fall by the wayside and be left stranded. For as in the stupendous progression of the human race whole nations drop away like dead branches from the living tree, so amongst nations individuals decay and perish in crowds as the dead leaves fall from the living branches. Nature indeed counts individual life very cheaply: in the development of vegetable and animal life she sacrifices numberless seeds and germs, of fifty bringing but one to bear, and in the organic evolution of mankind she sacrifices with like lavish profusion countless thousands of individual lives.

> "So careful of the type she seems,
> So careless of the single life."

It behoves us not to let these failures, these abortive minds, pass away without learning the lesson which their history conveys: they are instructive instances well fitted to teach the causes of failure, and thus to indicate the method of a successful adaptation to external nature. When he is thus brought into harmony with nature, the development of the individual becomes the consummate evolution of nature.

APPENDIX.

In order to illustrate more fully this chapter on the causation of insanity, I append here the short notes of fifty cases, all of which were under my care, and in which I laboured to satisfy myself of the conspiring causes of the mental disease :—

1. A captain in the army, and the only surviving son of his mother, who was a widow. She suffered very much from scrofulous disease, and he was wasting away with phthisis. Mental state, that of demented melancholia, with manifold delusions of suspicion. He was the last of his family, two brothers having died very much as he died. His grandfather began life as a common porter, ultimately became partner in a great manufacturing business, and, having amassed enormous wealth, made a great display in London on the strength of it. His high hopes of founding a family on the wealth which it was the sole aim of his life to acquire have thus issued.

2. There was direct hereditary predisposition, and the temperament was notably excitable through life. There was no evidence of excesses of any kind, but there had been many business anxieties. The mental disease was general paralysis.

3. An amiable gentleman, on the death of his wife, formed a connexion with a woman of loose character. Continued sexual excesses, with free indulgence in wine and other stimulants, ended in general paralysis.

4. A conceited Cockney, the son of a successful London tailor and money-lender, strongly imbued with the tradesman's spirit, and with offensive dissenting zeal. Hopelessly addicted to masturbation, and suffering from the disagreeable form of mental derangement following such cause.

5. Two ladies of middle age, unmarried, and cousins. They both suffered from extreme moral insanity, both revealing in their conduct the tyranny of a bad organization. There was insanity in the family, in one case the father being actually insane; and in both cases the parents being whimsical, capricious, and very injudicious as parents. A bad organization, made worse by bad training.

6. An unmarried lady, aged 40, addicted to the wildest and coarsest excesses, though of good social position and of independent means;

justifying in every respect her conduct, though it more than once brought her to the gaol. Family history not ascertainable, but evident not good organization in her. No aim nor occupation in life, but extreme egoistic development in all regards.

7. A publican, æt. 31, had done little for some time but stupify himself with brandy in his own bar-parlour. The consequence was furious mania and extreme incoherence: acute mania from continued intoxication, not *delirium tremens.*—Recovery.

8. A woman, æt. 47, of dark bilious temperament, who had endured much from her husband's unkindness and domestic anxieties, underwent "the change of life," and became extremely melancholic.—Recovery.

9. Hereditary predisposition marked. First attack, æt. 38, when unmarried. Second attack, æt. 58, she having a few years before married an old gentleman in need of a nurse. She was given to taking stimulants, fancied herself ill, and must always be having the doctor; in fact, hypochondriacal melancholia gradually grew into positive insanity.—Recovery.

10. A married lady, æt. 31, without children, and having great self-feeling. She went on one occasion to a Methodist meeting, was much excited by a violent sermon, and immediately went mad, fancying her soul to be lost, and making attempts at suicide.—Recovery.

11. A young lady, æt. 25, who had some anxieties at home, suffered a disappointment of her affections. Black depression running into acute dementia.—Recovery.

12. A married woman, æt. 44, of dark bilious temperament, had never had any children. At the "change of life" profound melancholia came on.

13. A gentleman, aged 60, of fine sensitive temperament, whose mother was said to have been flighty and peculiar, had himself been noted for slight peculiarities. He became profoundly melancholic, thinking himself ruined, and intensely suicidal. Refusal of food. Everything taken, however, was vomited, and diagnosis of organic abdominal disease, probably malignant, was made.—Death from exhaustion.

14. A bookseller, æt. 41, temperate, of considerable intellectual capacity, but of inordinate conceit; advocated a general division of property and other extreme notions. He ultimately got the notion that there was a conspiracy against him on the part of the Government, and tried to strangle his wife as a party to it. After two years he died of phthisis, with many of the symptoms of general paralysis.

The bodily disease seemed to have conspired with a natural vice of character, and thus to have made the mental derangement one of its earliest symptoms.

15. A married man, æt. 50, of anxious temperament. Profound melancholia; refusal of food. Second attack. Apart from the predisposition established by a former attack, the cause seemed to be great self-feeling, assuming a religious garb. Very fervent always in devotion, but intense egoistic feeling; entire reference of everything to self, and natural inability to form altruistic conceptions.—Recovery.

16. A single lady, æt. 38, fancied herself under mesmeric influence, in a state of clairvoyance, and had a variety of anomalous sensations. Rubbed her skin till it was sore in places, bit her nails to the quick, scratched her face, &c. Quasi-hysterical maniacal exacerbations. Irregularity of menstruation, and suspected self-abuse.—Recovery.

17. A lady, æt. 45, but looking very much older, having had an anxious life. Hereditary predisposition; change of life; melancholic depression, passing into destructive dementia. Convulsions, paralysis, death. Here softening of the brain was preceded for some weeks by mental symptoms.

18. Hereditary predisposition. Great intemperance. General paralysis.

19. Habitual alcoholic excesses; pecuniary difficulties; mania. After some years hemiplegia of right side, muscular power being partially regained after a time. The patient lived for years thus. Paralysis of long duration was the usual family disease and cause of death.

20. Suicidal insanity in a married lady. Strong hereditary predisposition to insanity. Exhaustion produced by lactation, and mental depression, occasioned by the long absences of her husband from home. —Recovery.

21. Third or fourth attack of acute moaning melancholia in a woman, aged 40. Intense self-conceit and selfishness natural to her. Gastric derangement, and obstinately constipated bowels. Whenever bodily derangement reaches a certain pitch, or adversity occurs, it seems to upset the equilibrium of an ill-balanced mind, predisposed to disorder by former attacks.—Recovery.

22. Gambling, betting, drinking, and sexual intemperance. General paralysis.

23. A bad organization plainly—not due to insanity in family, but to the absence of moral element. A life of great excitement, and of much speculation in Australia. Alcoholic and sexual excesses (?). General paralysis.

24. A widow, æt. 58, the daughter of one who had begun life as a labourer at a coal wharf, but who made a great deal of money. He was without education, so that his daughter, brought up as a rich person, but without social cultivation, did not get opportunely married: as it is expressed in the North, "she was too high for the stirrup, and not high enough for the saddle." When 50 years old, she married an old gentleman, whose former manner of life had made a nurse needful to him. He died, and left her the income of a large property for her life. She now got suspicious of his relatives, to whom the property was to revert on her death, was harassed with her money, which she did not know what to do with, but fancied others had designs on, and finally went from bad to worse until, believing all the world was conspiring against her, she got a revolver, and threatened to shoot her fancied enemies.

25. The daughter of a common labourer, who had become very rich in the colliery business, æt. 32, single. Her father being dead she was very rich; she was without any real education, and very vulgar, and spent the greater part of her time in drinking gin and reading sensational novels. Great hereditary predisposition, not to insanity only, but to suicidal insanity. Suicidal melancholia, with an incoherence approaching dementia.

26. A gentleman, aged 34. Steady, quiet drinking, on all possible occasions. The "ne'er-do-weel" of the family, having tumbled about the world in Mexican wars and South American mines, and in other places, as such persons do. Feebleness of mind and loss of memory. An uncle had been very much the same sort of person, and had died in an asylum.

27. A married woman, aged 49, gaunt, and seemingly of bilious temperament. After a fever of five weeks' duration, called "gastric," probably typhoid, acute maniacal excitement, violence, incoherence, &c.—Recovery within a fortnight.

28. Dementia after epilepsy, the fits occurring at the catamenial period. Brother maniacal, and sister without the moral element in her disposition.

29. The young lady before mentioned as No. 11 was removed by a penurious father from medical care before recovery was thoroughly established, and in opposition to advice. The return to home anxieties brought on an attack of acute mania, with gabbling of endless incoherent rhymes.—Permanent recovery this time.

30. A warehouseman, aged 35, a Primitive Methodist, grievously addicted to preaching. He had accomplished some self-education, but

had a boundless conceit of self, and infinite self-feeling. Indigestion, pyrosis, frequent vomiting after meals. Melancholia, with delusion that he had committed the unpardonable sin, and endless moaning. Most remarkable is the evidence of self-feeling in such patients—self-renunciation not being a word that enters into their vocabulary. This man, for example, though well aware that vomiting followed eating, and sufficiently afflicted thereby, could not be induced to regulate his diet voluntarily, but ate gluttonously, unless prevented.

31. A married woman, æt. 32, of stout habit of body, and habitually locked secretions. The sudden death of a son brought on severe moaning melancholia.

32. A single lady, aged 57, who had been insane for thirty years. There was the strongest hereditary taint.

33. A young man, extremely delicate, aged 22, had acute dementia, following acute rheumatism. There was valvular disease of the heart, with loud mitral regurgitant murmur.—Issue of the case unknown.

34. Slight hereditary predisposition, much aggravated by injudicious education. A tradesman's daughter, æt. 24, brought up in idleness. Domestic troubles and anxieties after marriage. Mania.—Recovery.

35. A woman, æt. 30, Wesleyan, single. Suicidal melancholia, with the delusion that her soul is lost. Menstrual irregularity. Extreme devotional excitement, with evidently active sexual feelings. —Recovery.

36. A young woman, æt. 25, single, Wesleyan. Mania. Cause, same probably as in the last case.—Recovery.

37. A respectable, temperate, and industrious tradesman, æt. 40, Wesleyan, a teetotaller, and much superior to a vulgar wife. Second attack. His father committed suicide; his brother is very flighty. General paralysis.

38. A sober, hardworking, respectable bookseller, not given to excesses of any kind, so far as was ascertainable. Slight hereditary predisposition. General paralysis.

In both these last cases there was general paralysis in men who had never been intemperate. In both, however, there were large families of children, and the struggle of life had plainly been very anxious and severe.

39. A woman, æt. 32. Acute mania came on two months after childbirth.

40. A lady, æt. 34, single, without other occupation or interest than religious exercises. Suicidal melancholia, with the delusion that she had sold herself to the devil. Amenorrhœa.—Recovery.

41. A married woman, æt. 40. Sudden outbreak of mania, after going to a revival meeting. Amenorrhœa.—Recovery.

42. A married man with a family, æt. 52, a Dissenter, holding an office of authority in his Church, and most exact in his religious duties. Secretly, he kept a mistress, however, and lived a rather dissipated life. Outbreak of acute mania, with a threatening of general paralysis.—Recovery; for a time at any rate.

43. Acute mental annihilation in a young man about a year and a half after marriage. One or two intervals of a few hours of mental restoration.—Death in epileptiform convulsions. Softening of the brain in extreme degree, but limited in extent. Excessive sexual indulgence.

44. A married woman, æt. 44, who has had several children, and who has become insane after each confinement. Maniacal incoherence and excitement, with unconsciousness that she has had a child.—Recovery.

45. Hereditary predisposition. A Dissenter of extreme views, narrow-minded, and bigoted. He was married when thirty-six years old, and became melancholic a short time after the birth of his first child.—Recovery.

46. Complete loss of memory, and of all energy of character, and failure of intelligence, in a man, æt. 36, single, from continual intemperance in drinking and smoking. Has previously had two attacks of *delirium tremens.*

47. An extremely good-looking young widow, who had been a singer at some public singing-rooms, and the mistress of the proprietor of them. Sexual excesses. General paralysis.

48. Attack of acute violent mania in a young surgeon, æt. 27. Afterwards three days' heavy stertorous sleep; then seeming recovery for twenty-four hours; but on the next day recurrence of mania, followed soon by severe epileptic fits.—Recovery.

49. Extreme moral perversion, with the most extravagant conceit of self, and unruly conduct in a young man, a clerk. Alternations of deep depression and suicidal tendency. Cause, self-abuse.

50. A single lady, aged 41, who, on her return from school when fifteen years old, was queer, listless, and has always since been rather peculiar. Hereditary predisposition. Acute melancholia, with the delusion that she is lost because she has refused an offer of marriage by a clergyman, such offer never having been thought of by him.

CHAPTER II.

INSANITY OF EARLY LIFE.

IF the account previously given of the gradual evolution of the so-called mental faculties be correct, the insanity met with in children must of necessity be of the simplest kind; where no mental faculty has been organized no disorder of mind can well be manifest. The kind of mental derangement displayed in early life will in reality serve as a searching test of the value of the principles already enunciated, and, if found to be in strict accordance with them, will not fail to afford strong support to them. While it is commonly thought sufficient to dismiss all such instances as singular anomalies in nature, inexplicable, and belonging to the regions of disorder—as though to call a thing unnatural were to remove it from the domain of natural law—any glimpse of law or order discernible in such confusion will be so far a gain.

The first movements of the child are reflex to impressions made upon it; but so quickly does sensorial perception with motor reaction thereto follow upon these early movements, that we are not able to fix a distinct line between the reflex and sensori-motor actions. The aimless thrusting out of the infant's limb brings it in contact with some external object, whereupon it is probable that a sensation is excited. But it would appear that the particular muscular exertion must be the condition of a muscular feeling of the act; so that the muscular sense of the movement and the sensation of the external object become associated, and for the future unavoidably suggest one another; a muscular intuition of external nature is in fact organized, and one of the first steps in the process of mental formation accomplished. If we call to mind how, when discussing actuation, it was shown, in the case of the eye, for example, that a sensation was the direct cause of a certain accommodating movement, and that the movement thereupon gave us the intuition of distance, we may perceive how the organic association of a sensation from without with a respondent or associated muscular act, does by degrees impart definite intuitions of external objects to the young mind. Suppose now that an infant becomes insane immediately after birth, what sort of insanity must it exhibit? The extent of mental disorder possible is clearly limited by the extent of existence of mental faculty; which, as we have seen, is almost nothing. In this regard the observed facts agree with theory; when a child is, by reason of a bad descent or of baneful influences during uterine life, born with such an extreme degree of instability of nervous element that, on the first play of external circumstances, its nervous centres react in convulsive form, it mostly dies in convulsions. The diseased action is a diseased action of the nervous centres of reflex action—those which alone have at this time power of functional action; the convulsions express the morbid condition of them,—might, indeed, be said to represent the insanity of them, as insanity, on the other hand, truly represents sometimes a convulsive action of the higher nervous centres.

It has been shown, however, that it is impossible, by reason of the close connexion of sensorial action with reflex action in the infant—the actual continuity of development which then exists—to fix a distinct period during which its functions are entirely reflex. It happens consequently that in the earliest morbid phenomena of nervous centres there is commonly the evidence of some sensori-motor disturbance. An impression on the sense of sight, for example, is not quietly assimilated so as to persist as an organized residuum in the proper nervous centre, but immediately excites a reaction outwards of the unstable cells of the associate motor centres; irregular and violent actions prompted by sensations testify to the disorder of the sensorial and corresponding motor centres, as convulsions testify to the disorder of the centres of reflex action. The phenomena of a true sensorial insanity are intermixed with the morbid manifestations of the lower nervous centres, and to every impression made upon the infant there is irregular and violent reaction, sensori-motor and reflex. Instances of such morbid action so soon after birth are certainly rare; nevertheless they do sometimes occur, and have been recorded. Crichton quotes from Greding a well-known case of a child which, as he says, was raving mad as soon as it was born. "A woman, about forty years old, of a full and plethoric habit of body, who constantly laughed and did the strangest things, but who, independently of these circumstances, enjoyed the very best health, was, on the 20th January, 1763, brought to bed, without any assistance, of a male child who was raving mad. When he was brought to our workhouse, which was on the 24th, he possessed so much strength in his legs and arms that four women could at times with difficulty restrain him. These paroxysms either ended in an uncontrollable fit of laughter, for which no evident reason could be observed, or else he tore in anger everything near him,—clothes, linen, bed furniture, and even thread, when he could get hold of it. We durst not allow him to be alone, otherwise he would get on the benches and tables, and even attempt to climb up the walls. Afterwards, however, when he began to have teeth he died." It is certainly remarkable that a child so young should have been able to do so much; and those who advocate innate mental faculties might well ask how it is possible under any other supposition to account for such an extraordinary exhibition of more or less co-ordinate power in so young a creature. Two considerations should be borne in mind with regard to this case: first, that the mother of the child was herself peculiar, so that her infant inherited an unstable condition of nervous element, and consequent disposition to irregular and premature reaction on the occasion of an external stimulus; and secondly, that there does, as previously set forth, exist in the constitution of the nervous system the power of certain co-ordinate automatic acts, such as correspond in man to the instinctive acts of animals. Many young animals are born with the power of immediately co-ordinating their muscles into definite action, and the human infant is not destitute of the germ of a like power over voluntary muscles, while it has complete the power of certain co-ordinate automatic acts; it is conceivable, therefore, that, without will, and even without consciousness, actions may be displayed in answer to sensations which, like those of this insane infant, have more or less semblance of design in them.[*] By reason of the morbid condition of nervous element we have a convulsive manifestation of the innate co-ordinate faculty—irregular, violent, and destructive movements, and the premature and extravagant exhibition of acts which would be natural in a more restrained form at a later stage of normal development, such, for example, as "uncontrollable fits of laughter without any evident reason."[†]

As the earliest condition of the infant's mind corresponds in a general way with the permanent condition of mind of those animals all the actions of which are reflex and sensori-motor, it is no wonder that the phenomena of infantile insanity should be comparable with those of animal insanity. In both cases the morbid phenomena are mainly referable to disorder of the sensorial and associate motor nervous centres; so that we might almost describe the insanity as *sensorial*. The elephant, usually a gentle enough creature, is subject at certain seasons to attacks of furious madness, in which it rushes about in the most dangerous way, roaring loudly, and destroying everything within its reach; and other animals are now and then affected with similar paroxysms of what might almost be called an epileptic fury. There is far more power in the insane elephant than in the insane infant, and it is able to do a great deal more mischief; but there is really no difference in the fundamental nature of the madness; the maddened acts are the reactions of morbid motor centres to impressions made on morbid sensory centres; and the whole mind, whether of the infant or of the animal, is absorbed in the convulsive reaction. The morbid phenomena of mind strictly confirm in this regard the principles which the study of the plan of development of mind established.

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[*] "That they do this by instinct, something implanted in the frame, the mechanism of the body, before any marks of wit or reason are to be seen in them, I am fully persuaded; as I am likewise that nature teaches them the manner of fighting peculiar to their species; and children strike with their arms as naturally as horses kick, dogs bite, and bulls push with their horns."—Mandeville's *Fable of the Bees*, vol. ii. p. 352.

[†] "The youngest person whom I have seen labouring under mania," says Sir A. Morison, "was a little girl of six years old, under my care in Bethlehem Hospital. I have, however, frequently met with violent and unmanageable idiots of a very tender age." Dr. Joseph Frank records having seen, on a visit to St. Luke's Hospital, in 1802, a case of mania occurring at the age of two years.—*Lectures on Insanity*, by Sir A. Morison, M.D. In the Appendix to one of the Reports of the Scotch Lunacy Commissioners, mention is made of a girl aged six years, who was said to be afflicted with congenital mania. She was illegitimate, and her mother was a prostitute. She could not walk, paraplegia having come on when she was a year old; she was incoherent, and subject to paroxysms of violent passion; at all times very intractable; slept little, and ate largely. Dr. Spurzheim (*Observations on Derangement of Mind*) views all such cases as partial idiots from birth. The cerebral organization at so early an age is, he adds, so delicate that it does not bear severe morbid affections without losing its fitness for mental development, and endangering life.

The moment we have recognised the existence of sensorial insanity, we become sensible of the value of the distinction. Not only does it furnish an adequate interpretation of the violent phenomena of the insanity of the animal and of the infant, but it alone suffices to explain that desperate fury which sometimes follows a succession of epileptic attacks. When the furious epileptic maniac strikes and injures whatsoever and whomsoever he meets, and, like some destructive tempest, storms through a ward with convulsed energy, he has no notion, no consciousness, of what he is doing; to all intents and purposes he is an organic machine, set in the most destructive motion; friend or foe alike perish before him; all his energy is absorbed in the convulsive explosion. And yet he does not rage quite aimlessly, but makes more or less definite attacks upon objects: he sees what is before him and destroys it; there is some method in his madness; his convulsive fury is more or less co-ordinate. These desperate deeds are respondent to morbid sensations; there often exist terrible hallucinations, such as blood-red flames before the eyes, loud roaring noises or imperative voices in the ears, sulphurous smells in the nostrils: and any real object which does present itself before the eyes is seen with the strangest and most unreal characters; lifeless objects seem to threaten his life, and the pitying face of a friend becomes the menacing face of a devil; his movements therefore do not answer to the realities around him, but to the unreal surroundings which his disease has created.* There exists for the time a true sensorial insanity, the higher nervous centres being in abeyance; and after the frantic paroxysm is over there is complete forgetfulness of it as there is forgetfulness of sensorial action in health. There are necessarily points of difference between this epileptic fury and infantile insanity, arising out of the residua, sensory and motor, that have been acquired and organized through experience in the proper centres of the adult: the residua in the sensory ganglia of the adult render possible those special hallucinations which the infant cannot have, and the residua in the motor centres, which are the condition of the secondary automatic faculties, render possible a degree and variety of violence which the infant, possessing only such germs of co-ordinate automatic power as are original, must needs fall short of.

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* An epileptic, under my care, usually a mild and gentle being, used to become a most violent and dangerous maniac after a series of fits, and to commit terrible destruction. He thought at these times that he was fighting for his life with a lion.

No one who has observed himself attentively when suddenly awaking out of sleep but must have noticed that he has had at times hallucinations both visual and auditory. He has heard a voice, which no one else could hear, distinctly say something, and on reflection only is convinced that the words were subjective; or he has waked up in the night and seen around him the objects of his dream, and been positively unable for a time to discriminate between the real and the unreal,—has perhaps laid down and gone to sleep again without successfully doing so. When the integrity of nervous element has been damaged, whether by reason of continued intemperance or from some other cause, these half-waking hallucinations acquire a vivid reality, and leave behind them a painful feeling in the mind. If we could imagine this temporary condition to last some time, and our actions to be in accordance with our hallucinations, then we should get a conception of that which is the state of things in sensorial insanity.

After a child has lived a few years, the residua of its sensations have been so far organized in their proper nervous centres that on the recurrence of a sensation it has a definite character: in other words, the child has acquired the power of definite sensory perception. Suppose now that some morbid cause, such as a deranged condition of the blood, excites to activity these slumbering or quiescent residua, there will then be a subjective sensation or hallucination, which may remain as such, or lead to an answering motor reaction. In dealing with sensorial insanity it is necessary then to bear in mind, as was done when treating of the physiology of sensation, both the *receptive* and the *reactive* side. A violent and convulsive reaction may mask all other features of the disease, and give it an *epileptiform* character; or the active sensory residua may persist in consciousness as hallucinations, giving rise, if they give rise to any answering movements, to such as are rather of a *choreic* character.

A variety of insanity in children, then, which we may next consider, is that form of sensorial insanity in which hallucinations occur, and in which the motor reaction is not epileptiform but choreic. There is some reason to think that temporary or fugitive hallucinations are not uncommon in infancy, and that the child stretching out its hand and appearing to grasp at some imaginary object is deceived by a subjective sensation. The excitation of the latent residua of sensation takes place from some internal cause, and bodily states thus give rise to temporary hallucinations in children, without there being any positive disease. Experimental proof of this manner of origin is not wanting: Dr. Thore describes the case of an infant, aged fourteen months and a half, which had accidentally been poisoned by the seeds of the *Datura stramonium;* hallucinations of sight occurred, as shown by the motions of the child, which seemed to be constantly seeking for some imaginary objects in front of it, stretching out its hands and clinging to the sides of the cradle in order to reach them better.* The most remarkable examples of such condition of hallucination is afforded, however, by that form of nightmare which some children suffer so much from: they begin shrieking out in the greatest terror without being awake, though their eyes are wide open; they tremble with fright, and do not recognise their parents or others who attempt to calm them; and it is some time before the paroxysm passes, and they can be pacified. They are for the time possessed with a vivid hallucination, which terrifies them beyond measure, and which does not readily subside; in the morning, however, they knew nothing of their fright, but have forgotten it as the somnambulist forgets his midnight walk, or as sensation is commonly forgotten. Strictly speaking, it is not proper to say that they have forgotten their mental state, because the activity was all the while sensorial, and, as there was no conscious perception, there could be no conscious memory. The undoubted and not uncommon existence of this state of vivid hallucination in children, when the matter has certainly passed beyond ordinary dreaming, will serve to prove how possible it is that children may have, when awake, positive hallucinations. Some who have written upon this subject have thought such a thing entirely impossible or exceptional, having been misled by the ill-grounded assumption that a hallucination must have some necessary connexion with a delusion. Certainly it must be, and it is, rare to meet with positive delusion in young children, inasmuch as at that time idea has not been fashioned in the mind; but the moment a child has acquired a definite sensation, it is possible for it to have a hallucination.

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* Annales Médico-Psychologique, 1849.

It is in strict accordance, then, with physiological principles, as well as with pathological observation, to affirm the existence in children of a variety of sensorial insanity, which is characterised by hallucinations, mostly of vision, and sometimes by correspondent irregular movements. Fits of involuntary laughter are often notable in such cases: the laugh, or rather smile, of the infant is an involuntary sensori-motor movement before it has any notion of the meaning of the smile, or any consciousness that it is smiling; and as one of the expressions of a morbid state of things, therefore, we meet with the irregular and convulsive manifestation of this function. Dr. Whytt relates the instance of a boy, aged 10, who, in consequence of a fall, had violent paroxysmal headaches for many days. After a time there occurred "fits of involuntary laughter, between which he complained of a strange smell and of pins pricking his nose; he talked incoherently, stared in an odd manner," and immediately afterwards fell into convulsions. He recovered on this occasion, but two years afterwards was similarly attacked: he had severe headache, saw objects double, and suffered from a severe pain in the left side of his belly, confined to a spot not larger than a shilling; "sometimes it shifted, and then he was seized with fatiguing fits of involuntary laughter." Ultimately he recovered partially, but never completely.* It is always desirable, in cases of hallucination in children, to make a close examination of the state of the general sensibility; for perversions or defects of it will frequently be found both where there are corresponding perversions of a choreic character on the motor side and where there is no evidence of motor disorder. Because this form of sensorial insanity is often found associated with more or less evidence of chorea, and because, as compared with the previously illustrated epileptiform variety, it has relations not unlike those which chorea has to epilepsy, it may be described as the *choreic* variety of *sensorial insanity.*

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* Op. cit. p. 144.

Perhaps no more fitting opportunity than the present will present itself for reference to the singular state of somnambulism, the phenomena of which illustrate in a striking manner that independent action of the sensorial and corresponding motor centres which plays so important a part in the early mental life of the child, and so large a part in the daily life of the adult. An individual appears to be fast asleep, and yet executes complicated acts of some kind which he could hardly do, and certainly could not do better, if he were awake; his highest nervous centres are in abeyance, and yet his movements are as skilful as if they were under the cognizance and control of these supreme centres. But the man's senses are not entirely asleep, and the organized motor reactions to impressions on these senses are not asleep: he is a sensori-motor being, and very much in the position of one of those lower animals that are destitute of cerebral hemispheres, and which notwithstanding are exceedingly active in their movements; or very much in the position of a child before the higher centres of idea have come into action. Recently there has come under my observation a striking instance of somnambulism in a young woman suffering from consumption, who has on many occasions risen from her bed in the night, gone through a sustained series of rather difficult acts, and returned to bed without ever knowing what she had been doing; in the morning after such feats, however, she feels general aching in the limbs, exhaustion, and prostration, such as from her description of her suffering would appear to be very like that which follows an epileptic fit in the night. One example of what she did in her sleep may be adduced here: she was engaged in quilting a petticoat for a lady, and after a good day's work went to bed at night, intending in the morning to get up early and finish it; but, when the morning came, she was so weary and prostrate that she felt quite unable to rise; she called her mother, therefore, and told her to say, should the lady send for her petticoat, that she was so ill that she had not been able to finish it. The mother, wishing to see how much still remained to be done, fetched the petticoat, when it was found to be finished: the poor girl had been up in the night, and, seen of no one, had completed her task. Soon the long day's task of life will be over with her, and she will sleep well where no troubles more can reach her, and no dream of work or sorrow disturb her slumbers.

If it were possible artificially to induce a temporary disorder in the sensory and corresponding motor centres of the somnambulist, such as would give rise to hallucinations and answering motor reactions, while his higher centres remained in abeyance, he would in reality be put, according to the degree of disorder, either in the condition of the child suffering from what has been described as the choreic variety of sensorial insanity, or in the condition of the man who, after a succession of epileptic fits, is attacked with furious sensorial insanity. Suppose, however, that after a moderate disorder had been artificially excited in the somnambulist's sensorial centres, such as might engender hallucinations, his higher centres of cognition were to awake to activity,—what would be the result? Either he would be imposed upon by the false sensations, and his thought thus share in the disorder of his sense; or his reflection would discover the subjective nature of the hallucination, and he would then be very much in the position of the well-known Nicolai of Berlin, and of others who, like that bookseller, have suffered from hallucinations of the nature of which they were quite conscious. Every one who has observed himself with attention must have been conscious of occasions on which a suddenly occurring hallucination has caused him to make a quick respondent movement, which, recognising the hallucination, he has discovered to be unnecessary. But it is different with a very young child, which, if it is affected with a hallucination, *must* believe in it; it cannot correct sense by reflection, because the higher nervous centres have not yet entered on their full function. Hallucinations may, therefore, exist temporarily in children without indicating any serious disturbance; the organic residua of sensation being quickened into activity by an internal cause, before any distinct perception of the cause of the sensation has been formed.

Thus far, then, it is certain that hallucination may occur in a child before it has acquired a definite idea. With each succeeding presentation of an object to the child, however, the impressions made by it on the different senses become more and more combined, so that an *idea* of the object is at last organized in the higher ideational centres; there is a consilience of the sensory impressions into an idea, which henceforth makes it possible for the child to think of the object when it is not present before the senses, or to have a definite and adequate perception of it when it is. As development proceeds, one idea after another is thus added to the mind until many simple ideas have been organized in it; but for a long time these ideas remain more or less isolated and imperfectly developed; there are no definite associations between them, and the child's discourse is consequently incoherent; there is not moreover a complete organization of residua, and its memory is consequently fallacious. Children, like brutes, live in the present; their happiness or misery being dependent upon impressions made upon the senses: their actions are direct reactions to impressions; the idea or emotion excited does not remain in consciousness and call up other ideas and emotions, but it is directly uttered in outward action. Such a condition of development, which is natural to the child before the fabric of its mental organization has been built up, and to the animal in which the state of the nervous system renders further development impossible, would, were it met with in an European adult, represent idiocy, or an arrest of mental development from morbid causes.

So soon as a definite idea has been organized in the child's mind a *delusion* is possible. But as ideas are at first comparatively few in number, and as they are very imperfectly associated, a derangement of the function of their centres must be characterised by a very incoherent delirium. Divers morbid ideas will then spring up without coherency; and the morbid phenomena, wanting system, will correspond, not so much with those which in the adult we describe as mania, as with those described as delirium. In the mania of the adult there is commonly a systematized delirium, some coherency between the morbid ideas, some method in the madness; whereas in the delirium from fever or other cause, ideas spontaneously arise in consciousness in the most incoherent way: in the young child the ideas are equally incoherent by reason of the absence of an organic association between the residua. Let us proceed then to test these principles by an examination of such facts as are available.

As a morbid idea in the child's mind has, by the nature of the case, but a small range of action upon other ideas, it will tend to utter itself by its other paths of expression; namely, by a downward action upon the sensory ganglia or upon the movements. When it acts downwards upon the sensory ganglia, it gives rise to a hallucination; and in such case, as may easily be imagined, it will not always be possible to determine whether the hallucination is really secondary or primary—whether it is engendered indirectly through the morbid idea or directly by the excitation of the sensory residua by some organic cause. When a child of only a few years old sees figures of some kind on the wall, which have no real existence, but disappear with apparently as little reason as they came there, the hallucination is most likely owing to some organic cause affecting directly the sensory ganglia. But when a child of eight or nine years old, whose head has been wickedly filled with foolish and dangerous notions concerning the devil and hell, suddenly sees the frightful face of a devil appear and threaten to eat him up, and shrieks in terrified agony, then the hallucination is undoubtedly secondary to the wilfully implanted delusion. In a few moments the phantasm disappears, and the child regains its composure. This sort of idea-produced hallucination occurs doubtless frequently enough in those nightmares of children already mentioned.

This secondary manner of generation of a hallucination again is strikingly illustrated by the occurrence of phantasms before the eyes of certain precocious children, which appear to be visible representations of the thoughts that are passing through their minds: what they think that they actually see. Accordingly a sort of drama is evolved before their eyes, and they live for the time in a scene which is purely visionary as though it were quite real. "What nonsense are you talking, child?" the mother perhaps exclaims; and thereupon the pageant vanishes. In delicate and highly nervous children, affected with mesenteric tubercle—and, perhaps, also with meningeal tubercle—it sometimes happens that great anxiety is caused to the mother by the strange way in which, during the night, when outer objects are shut out by the darkness, they will talk as if they were surrounded by real events, or, as the mother perhaps puts it, as if they were light-headed. They are dreaming while they are awake; though the outer world is shut out, the morbid deposit within acts as an irritating stimulus to the ganglionic nervous centres, and thus gives rise to an automatic activity of them. Such hallucinations may undoubtedly be fugitive events in the history of any child endowed with a highly nervous temperament, as in William Blake, the engraver, and may not denote any positive disease; but if the habit grows upon the child by indulgence, and the phantasms are regularly marshalled into a definite drama,—as, for example, was the case with Hartley Coleridge,—then a condition of things is initiated which will in all likelihood ultimately issue in the degeneration of some form of insanity.* For it is not the natural course of mental development that ideas, so soon as they are fashioned in the mind, should read directly downwards upon the sensory ganglia, and thus create a visionary world; but, on the contrary, it is necessary in the progress of mental development that ideas should be completely organized within the centres of consciousness, and should react upon one another there; that thus, by the integration of the like in perceptions and the differentiation of the unlike, accurate conceptions of nature should be formed and duly combined in the mental fabric; and that the reaction upon external nature should be a definite, aim-working, volitional one. Men like Hartley Coleridge cannot possibly have a will, because the reaction of their supreme nervous centre is prematurely expended in the construction of toy-works of the fancy; the state of things corresponds in some sort with that which obtains in the spinal centres when, by reason of an instability of nervous element, direct reactions take place to impressions, so that definite assimilation and acquired co-ordination are rendered impossible; in both cases an arrest of development, commonly the forerunner of more active disease, is marked. The precocious imagination of childhood should always be restrained as an actual danger, not fostered as a wonderful evidence of talent, and the child should be solicited to regular intercourse with the realities of nature, so that by continued internal adaptation to external impressions there may be laid up in the mind stores of *material*, and that, by an orderly training, this may be moulded into true *forms*, according to which a rightly developed imagination may hereafter work in true and sober harmony with nature.

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* "Blake's first vision was said to be when he was eight or ten years old; it was a vision of a tree filled with angels. Mrs. Blake, however, used to say—'You know, dear, the first time you saw God was when you were four years old, and He put His head to the window and set you screaming.'"—Gilchrist's *Life of Blake.*

The difference between *fancy* and *imagination*, as Coleridge has very aptly remarked, corresponds with the difference between *delirium* and *mania*. The fancy brings together images which have no natural connexion, but are yoked together by means of some accidental coincidence; while the imagination combines images seemingly unlike by their essential relations, and gives unity to variety. Now the precocious imagination of a child, which sometimes delights foolish parents, cannot possibly be anything more than lying fancy; and this, for exactly the same reason as it has already been shown that the insanity of children must be a delirium, and cannot be a mania. Those who like to speak of faculties of the mind may certainly maintain that fancy and imagination are fundamentally the same faculty; if so, they should bear in mind, however, that fancy indicates the faculty working wildly and often mischievously, without adequate material and without due training, and that imagination represents the working of the faculty when duly supplied with proper material and justly developed by a proper training. In like manner, those who consider closely and without prepossession the fundamental meaning of the character which the delirium of children has, will not fail to recognise in it the strongest evidence of the gradual organization of our mental faculty; the fancy of the sane, and the delirium of the insane, child both testify to the same condition of things—that which the habitual incoherence of a child's discourse also evidences.

In order to exhibit clearly the manner of the action of a morbid idea in children, and to educe from it a physiological lesson, its operation has been somewhat artificially separated from other morbid phenomena which usually accompany it. In young children it is very rare to meet with disorder confined to the supreme nervous centres; for the other centres are certain to participate more or less markedly in the morbid action. In chorea, for example, besides the disordered movements which are its common characteristic, there are often hallucinations marking disorder of the sensorial centres, and motiveless weeping or laughing, or acts of mischief and violence, marking disorder of some of the higher motor centres; there are furthermore in some cases mental excitement and incoherency, which may pass into maniacal delirium, and end fatally, or into chronic delirium, and end in recovery. The different centres sympathise with one another; and, according as they minister to ideation, sensation, or movement, express their disorder in delirium, hallucination, or spasmodic movements.

Let us now proceed, then, to arrange in groups the different forms of insanity that are actually met with in children.

1. *Monomania, or Partial Ideational Insanity.*—When a morbid idea or delusion reacts downwards, but not upon the sensory ganglia in the way described, its action is upon the movements, and it is realized in some particular act. Is this kind of monomania ever met with in children? Certainly it is; and, as might be predicted from a consideration of the child's mental development, chronic ideational insanity will commonly be of this partial kind. It admits of no question, that the desperate sort of monomania which is manifest in a powerful impulse to some act of violence—the kind of disease in which the morbid idea attains to such a *nisus* for outward reaction as to become an irresistible impulse—is met with occasionally in children. Examples of children thus possessed with an uncontrollable impulse are given by Esquirol: in one case, a child, of only five or six years old, made repeated attempts to kill its stepmother, who had always treated it kindly; in another case, a child was afflicted with a never-resting impulse to steal without having need for, or making any use of, what it had stolen; another child was ever striving with a perverse diligence to set fire to whatever it could; and another displayed a persistent longing desire for self-destruction—a genuine suicidal monomania. These are indisputable instances of what have been designated homicidal monomania, kleptomania, pyromania, and suicidal monomania. Let the psychologist explain them how he will, they are in strict accord with physiological observation; and their occurrence at so early a period of life, where some morbid taint,

inherited or acquired, can usually be traced, is a strong argument in favour of the principles already laid down. Children, again, have thought themselves possessed with the devil, who moved them to perpetrate the strangest acts; and at the time of the Crusades, when the Western world was infected with a fanatical enthusiasm for delivering the Holy Sepulchre from the hands of the infidels, the infection of the madness spread through a host of children, who marched off to Jerusalem "to deliver the sepulchre of the Lord," most of them perishing miserably on the way, others of them being sold as slaves, and none of them reaching their goal.

2. *Choreic Delirium, or Choreic Ideational Insanity.*—There is a choreic delirium sometimes met with in children, which appears to be the exact counterpart of the choreic spasms that occur. What is sufficiently striking, even to an ordinary observer of this delirium, is its marked incoherency, and the manifestly automatic character of it. It might, indeed, appear that the cells or groups of cells of the primary centres had been dislocated from their connexions, and that each cell, or group of cells, was acting on its own account, giving rise thereby to a sort of mechanically repeated and extremely incoherent delirium. A boy of about eleven years of age, who came under my care, was, after a slight and not distinctly described sickness, suddenly attacked with this form of delirium; he moved about restlessly, throwing his arms about and repeating over and over again such expressions as—"The good Lord Jesus," "They put Him on the cross," "They nailed His hands," &c.: it was impossible to fix his attention for a moment; for he turned away, wandered aimlessly about, pointing to one hand and then to the other, and babbling his incoherent utterances. As far as could be made out, there was considerable insensibility of the skin over certain parts of the body. In two days, after appropriate treatment, the delirium passed off, and the boy was quite himself again.

Dr. Bucknill relates the case of a boy, aged twelve, who was admitted into the Devon Asylum, and who had been affected all his life to some extent with chorea. A few days before admission he had attempted to hang himself, and there was the mark made by the rope upon his neck. On admission, he was acutely maniacal, attempted to dash his head against the walls, and, when put in the padded room, lay on the floor, crying—"Oh, do kill me! Dash my brains out! Oh, do let me die!" He kicked and bit the attendants, and tried in every way to kill himself: his head was hot, his pulse quick, he refused food, and did not sleep. He completely recovered under proper treatment after a few days.

These two cases will suffice as illustrations of choreic mania: it is only necessary to bear in mind that—as with choreic movements, so with choreic insanity—there are met with examples of every degree of convulsive violence and incoherency. Hallucinations of the special senses and perversions of general sensibility will frequently also accompany the delirium.

3. *Cataleptoid Insanity.*—Another form which insanity may take in childhood is that of a more or less complete ecstasy; and this may be appropriately described as the cataleptoid variety. It generally occurs in young children: the little patient lies perhaps for hours or days seemingly in a sort of mystical contemplation, with limbs more or less rigid, or fixed in strange postures; sometimes there is insensibility to impressions, while in other instances vague answers are given, or there is actual incoherent raving; there may be sudden bursting out into wild shrieks. These attacks are of variable duration, and are repeated at varying intervals: they would seem to represent a sort of spasm of certain nervous centres, so that for a time being the body becomes an automatic instrument of their activity, while all voluntary power is in abeyance. While, on the one hand, there are intermediate conditions between this form of disease and chorea, its attacks, on the other hand, sometimes alternate with true epileptic seizures, and at other times pass gradually into them. In a girl who came under Dr. West's treatment at the age of ten years and ten months, there had been first an attack of general convulsions without any obvious cause, when she was eight years old. Afterwards she was subject to occasional attacks of great excitement of behaviour, and for six months there was a sort of cataleptic state in which she stood immoveable for one or two minutes, staring wildly or fixedly, and murmuring unconnected words that had reference to any object which she might happen to see. About eleven months from the commencement of these attacks their character changed; they

became truly epileptic, the child's conduct in the intervals between the seizures, though sometimes quite reasonable, having mostly something insane about it.* The example may serve to illustrate how closely related are disorders of the different nervous centres in children, as well as to show the hybrid character of the diseases presented, and the artificial character of the divisions usually made between them.

4. *Epileptic Insanity.*—Not only are the different forms of epilepsy met with in children, but the different forms of insanity that occur in connexion with epilepsy are also exhibited in early life. The *petit mal* sometimes lasts for many months in children, and then passes into regular attacks of convulsive epilepsy; the usual effect of which is to produce loss of memory and more or less dementia. In the case of a young girl, aged eight years, of good physical conformation, who came under my care, there seemed to have been produced by epilepsy an arrest of mental development at the sensorial stage: she was a most mischievous little machine, never resting, but seizing, or attempting to seize, whatever she saw; nowise content with what she caught hold of, but throwing it down directly she had got it, and struggling for something else; not amenable to correction or instruction, and demanding the whole energies of one person to look after her: she was an automatic machine incited by sensory impressions to mischievous and destructive acts.

As in adults, so in children, an attack of violent mania, or a *furor transitorius,* may precede, or take the place of, an attack of epilepsy, representing in reality a masked epilepsy. Children of three or four years old are sometimes seized with sudden attacks of violent shrieking, desperate stubbornness, or furious rage, when they bite, tear, and destroy whatever they can; these seizures come on periodically, and may either pass in the course of a few months into regular epilepsy, or may be found to alternate with epileptic attacks, representing a vicarious epilepsy. Morel has met with two cases in which children fell into convulsions and lost the use of speech in consequence of a great fear; afterwards a maniacal fury, with tearing, destroying, and continual turbulence, occurred: in one case, the child being ten years and a half old, epilepsy followed; in the other child, aged five years, it did not.* One of the boys in a school was attacked in the night, without evident cause, with a sudden *furor transitorius:* he rushed wildly up and down the dormitory, speaking loudly but inarticulately, so that another of the pupils got up to quiet him; but he seized the latter with great violence, and, but for assistance, would have strangled him. With some difficulty he was got to bed; a true epileptic attack followed; and in the morning he knew nothing whatever of what had happened, but felt weary and exhausted.†

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* Ueber Epilepsie, Blödsinn und Irrsein der Kinder, von Charles West, M.D.—*Journal für Kinderkrankheiten*, vol. xxiii. 1854. See also a paper by M. Delasiauve in *Annales Médico-Psychologique*, vol. vii. 1855.

Again, in children as in adults, regular attacks of maniacal excitement may follow epilepsy. Many such instances are on record; but I shall content myself here with a singular example of insanity, more cataleptoid perhaps than epileptic, following convulsions, which is quoted by Griesinger from Kerner:—Margaret B., æt. 11, of a passionate disposition, but a pious, Christian child, was, without any previous illness, seized on January 19th with convulsive attacks, which continued, with few and short interruptions, for two days. So long as the convulsions lasted the child was unconscious, twisted her eyes, made grimaces, and strange movements with her arms: from the 21st January a deep bass voice proceeding from her kept repeating the words, "They are praying for thee." When the girl came to herself, she was wearied and exhausted, but knew nothing of what had happened, only said that she had dreamed. On the evening of the 22d January another voice, quite different from the bass one, spoke incessantly while the crisis lasted—for half an hour, an hour, or several hours; and was only now and then interrupted by the former bass voice regularly repeating the recitative. The second voice manifestly represented a different personality from that of the girl. distinguishing itself in the most exact manner, and speaking of her in the third person. In its utterances there was not the slightest confusion nor incoherency observable, but all questions were answered by it coherently. What, however, gave a distinctive character to its expressions was the moral or rather immoral tone of them—the pride, arrogance, scorn and hatred of truth, God, Christ, that were declared. "I am the Son of God, the Saviour of the world: me ye shall worship," the former voice frequently repeated. Scorn of all that is sacred, blasphemy against God and Christ, violent dislike of everything good, and extreme rage at the sight of any one praying, or even of hands folded as in prayer, expressed by the second voice—all these might well betray the work of a strange spirit possessing her, even if the pious voice had not declared it to be the voice of a devil. So soon as this demon spoke, the countenance of the girl changed in the most striking manner, and assumed a truly demoniacal appearance. She ultimately quite recovered, a voice crying out—"Get thee out of this girl, thou unclean spirit."

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* Traité des Maladies Mentales, 1860, p. 102. He relates another case of a girl, æt. 11, who had furious maniacal attacks, during which she attempted to kill her mother, and injure her sisters, and who finally recovered.

† Ueber Mania Transitoria, von Dr. Ludwig Meyer. Virchow's *Archiv*, vol. viii. art. ix. He relates another case of a boy, æt. 13, who was subject to periodical attacks of fury, followed by epileptic convulsions, and who often had the furious maniacal excitement without the convulsions, illustrating the transition of *mania transitoria* into epilepsy.

5. *Mania.*—Although the delirium of childhood commonly occurs in connexion with some form of convulsive disease, yet it is possible for it to occur from other recognised causes of mania; these in children usually are blows on the head, intestinal worms, and onanism. It is certainly surprising how greatly tolerant of injury the young brain is; children will recover without any bad symptoms from an injury which would inevitably prove fatal to the adult: in one severe case of fracture of the skull in a child, which came under my observation, the bones loosely grated as in a bag under the scalp whilst the child's head was held, and yet it recovered without any severe symptoms. Under the name of *Monopathie furieuse* Guislain describes maniacal attacks in a young girl æt. 7, which were due to caries of the nose following a blow. Other like cases are recorded by Haslam, Spurzheim, Frank, Burrows, Perfect, and Friedreich. The most striking example of mental derangement in children which Morel ever met with was in a little girl æt. 11, who, after the sudden disappearance of a disease of the skin, exhibited choreic symptoms, and soon afterwards those of true maniacal fury. She tried to kill her mother, and had nearly

drowned one of her sisters by throwing her into a pond: in her paroxysms she displayed a strength almost incredible, and it is scarcely possible to communicate an adequate idea of the destructive tendencies of the little being. She recovered after a fever, when all medical treatment had failed. Certain acute diseases, as for example typhus, may of course give rise to delirium in the child just as in the adult.

6. *Melancholia.*—This form of depression is met with in children both with and without definite delusion or morbid impulse. Without doubt children differ naturally in liveliness of disposition; but it sometimes happens that depression arrives at such a pass even in very young children as to constitute a genuine melancholia. In such case the child whines and wails on all occasions, and whatever impression is made upon it seems to be followed by a painful feeling: the mother brings it for medical advice; for, as she complains, it thrives not, it rests not either by night or day, it is continually crying, and nothing calms it; there is no living with it, and she is almost worn out with anxiety. Such symptoms mark a constitutional defect of nervous element, whereby an emotional or sensational reaction of a painful kind follows all impressions; the nervous or psychical *tone* is radically infected with some vice of constitution, so that every impression is painful; and, according to my experience, the cause of the defect in a great many instances is inherited syphilis. At any rate remarkably beneficial results often in such cases follow the treatment for hereditary syphilis. No doubt other causes besides syphilis may give rise to a like morbid condition of nervous element.

With the deep melancholic depression there may be associated, in older children, a distinct delusion of some kind. A boy who from his fifth year had been rather peculiar in his behaviour, standing still occasionally without apparent reason in the street and not moving again without considerable pressure, was, when aged twelve, afflicted with positive melancholia and delusions of suspicion. He was extremely depressed, and his manner indicated the greatest fear; he was prone to weep constantly, and was in great dread of his fellow-scholars and of his teacher, all of whom, he thought, suspected him of anything wrong that happened to be done—if a theft were committed, he was sure that he was suspected to be the thief. He was restless at night, and often sighed and uttered unconnected words in his sleep. In five weeks he was said to have recovered, but there still remained eccentricities of conduct: if he kicked a stone, he must return to kick it twice more; if he spat once, he must spit twice more; if he had written a word incorrectly, he must repeat the correction. Of these peculiarities he was quite conscious, and struggled against them, but without avail; after great restlessness and mental disquietude he was ultimately obliged to give way to them.* In other like cases, morbid notions with regard to religion may be the exponents of the emotional disturbance of psychical tone.

Perhaps the most striking form in which the melancholia of children manifests itself is by suicide. So strange and unnatural a thing does it seem that a child of eight or nine years of age should, world-weary, destroy its own life, that one is apt to consider the fact inexplicable. Such act of suicide is certainly done sometimes under a sudden impulse from the dread of punishment or after the infliction of punishment, or it is perhaps deliberately resolved upon in a state of sadness and depression consequent upon continued ill-treatment by a brutal schoolmaster or parent.† Falret mentions the case of a boy of eleven years of age, who was driven by the ill-treatment of his teacher into such a state of melancholia that he determined to starve himself, and made repeated attempts at suicide by drowning. This premature disgust of life will most often be found to be the result of some ancestral taint, whereby the child's nervous constitution is inherently defective, and disposed to perverted feeling and irregular reaction. The question of hereditary taint is in reality the important question in an examination of the insanity of early life.

7. *Affective Insanity, or Moral Insanity.*—In the majority of instances the affective insanity of early life might justly be described as hereditary; but there are some cases in which the morbid condition of nervous element which manifests itself in extreme moral perversion is not inherited but observably

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* Irrsein bei Kinder, von Dr. Beckham.

† Étude sur le Suicide chez les Enfants, par Durand Fardel.—*Annales Médico-Psychologique*, 1855.

acquired by reason of vicious habits of self-abuse. It is not correct, therefore, to describe all cases of so-called moral insanity in children as examples of hereditary insanity. I prefer to use the word *affective* to the word *moral*, because the latter term is very vague, and implying, as it does, a consciousness, is often inappropriate, and always objectionable: the affective life, or feeling, on the other hand, mirrors the real nature of the individual; the term *affective insanity* will, therefore, appropriately express the fundamental vice of nervous element in such case.

The examples of affective insanity in early life fall naturally into two divisions: (*a*) the first includes all those instances in which there is a strange perversion of some fundamental instinct, or a more strange appearance of some quite morbid impulse; and (*b*) the second division comprises all those cases of systematic moral perversion in which there often seems to the onlooker to be wilful wickedness. The former might be described as the instinctive variety of affective insanity; the latter as moral insanity proper.

(*a*) *Instinctive Insanity.*—What are the inborn instincts of mankind? The instinct of self-conservation, which is truly the law of the existence of living matter as such, and the instinct for propagation which provides for the continuous existence of life, and is, therefore, in some sort a secondary manifestation of the self-conservative instinct. Now the instinct of self-conservation is manifested not only by individual organic element, humble or exalted, but it is manifest in all the phenomena of vitality, conscious or unconscious: it is, as already seen, at the foundation of all the passions, which are fundamentally determined according as impressions produce gratification of self or are painful to self. Children are of necessity extremely selfish; for it is the instinct of their being to appropriate from without, to the end that development may take place: a baby is the only king, as has been said, because everybody must accommodate himself to him, while he accommodates himself to nobody. Associated, however, as necessarily correlate with the instinct of appropriation whereby what is grateful to self is assimilated, is plainly a destructive or repulsive instinct or impulse whereby what is not grateful to self is rejected, got rid of, or destroyed. The infant rejects the mother's breast if from some cause, internal or external, the milk is not grateful to it; by crying and struggling it strives to get rid of a painful impression which may happen to be affecting it, as the Gregarina shoots away from a stimulus, or as a snail retracts its protruded horns when they are suddenly touched; and when it is a little older, it destroys or attempts to destroy what is not pleasing to it. To talk about the purity and innocency of a child's mind is a part of that poetical idealism and willing hypocrisy by which man ignores realities and delights to walk in a vain show. The purity and innocence of the child's mind, in so far as they exist, testify to the absence of mind: and the impulses which actually move it are the selfish impulses of passion. "A boy," says Plato, "is the most vicious of all wild beasts;" or again, as it has been put, "a boy is better unborn than untaught." By nature sinful above everything, and desperately wicked, man acquires a knowledge of good through evil; his passions are refined and developed through wider considerations of interest and foresight; the history of mental development begins with the lowest passions, which circulate as an undercurrent in every life, and frequently come to the surface in a very turbulent way in many lives. Evil is good in the making as vice is virtue in the making. "I cannot praise," continues Milton, after saying that we know good by evil, "a fugitive and cloistered virtue, unexercised and unbreathed, that never sallies out and sees her adversary, but slinks out of the race where that immortal garland is to be run for, not without dust or heat. Assuredly we bring not innocence into the world, we bring impurity much rather: that which purifies us is trial, and trial is by what is contrary ... That virtue therefore which is a youngling in the contemplation of evil, and knows not the utmost that vice promises to her followers, and rejects it, is but a blank virtue, not a pure; her whiteness is but an excremental, adventitious whiteness."

When insanity is met with in the young child, we observe what we do in the adult under the same circumstances—passion in all its naked deformity and in all its exaggerated exhibition. The instincts, appetites, or passions, call them as we may, manifest themselves in unblushing, extreme, and perverted action; the veil of any control which discipline may have fashioned is rent; the child is as the animal, and reveals its animal nature with as little shamefacedness as the monkey indulges its passions in the face of all the world. As in the child of three or four years old there is as a rule only the instinct of gratifying itself, involved in which is the effort to reject or destroy what is not agreeable, its disease, if it become insane, will be exhibited in a perverse and unceasing appropriation of whatever it sees, and in destructive attacks upon whatever it can destroy. Refuse it what it grasps at, and it will scream, bite, and kick with a frantic energy: give it the object which it is striving for, and it will smash it if it can: it is a destructive little machine which, being out of order, lays hold of what is suitable and what is unsuitable, and subjects both alike to its desperate action. Haslam reports a case of this kind in a girl, aged three and a quarter years, who had become mad at two and a half years of age, after inoculation for small-pox. Her mother's brother was, however, an idiot, though her parents were sane and undiseased. This creature struggled to get hold of everything which she saw, and cried, bit, and kicked if she was disappointed. Her appetite was voracious, and she would devour any sort of food without discrimination; she would rake out the fire with her fingers, and seemed to forget that she had been burnt; she passed her urine and fæces anywhere. She could not be taught anything, and never improved.*

The most striking manifestation of the destructive impulse which sometimes reaches such an extreme degree in the madness of childhood is afforded by the instance of homicidal impulse. "A girl, aged five years, conceived a violent dislike to her step-mother, who had always treated her kindly, and to her little brother, both of whom she repeatedly attempted to kill."† Here there was a sort of conscious design apparent in the act; but it is obvious that the further back in mental development we go, the less of conscious design will there be in the morbid manifestation of the inborn impulse. Moreover, in the case of homicidal impulse in a young child, the consciousness of the end or aim of the act must at best be of a very vague and imperfect kind: the child is driven, by an impulse of which it can give no account, to a destructive act, the real nature of which it does not appreciate: a natural instinct is exaggerated and perverted by disorder of the nerve centre, and the character of its morbid manifestation is often determined by accidents of external circumstances; the child is driven by an automatic impulse to kill its stepmother as it would strive to kill a canary bird or to destroy crockery ware, the impulse being as much its master as the convulsion of its limb is in chorea. Many cases, again, are on record of older children who have displayed a hideous and uncontrollable propensity to acts of cruelty and destruction, practised on such creatures as were not too powerful to be their victims.

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* Observations on Madness.

† Esquirol, Traité des Maladies Mentales.

Because of the variety of forms which the morbid manifestations of perverted instinct may take, it sometimes happens that a young child very much resembles a monkey in its conduct, as it does in its wizened and old-fashioned face. It may display a wonderful talent for mimicry, a precocious skill in lying with all the ease of an instinct, and a positive faculty for thieving which is quite natural to it. Of the best thieves as of the best poets it may in truth be said that they are born, not made. Though we are apt to look on such precocious viciousness as singular and inexplicable, a little reflection will show that under conditions of disease it is just as natural in the child as it is in the monkey under conditions of normal development.

Thus much concerning those phenomena of insanity in children that spring from the perversion of the self-conservative impulse. Let me now say a few words with regard to the perversion of the instinct of propagation. It is necessary first to guard against a possible objection that this instinct is not manifest till puberty, by the distinct assertion that there are frequent manifestations of its existence throughout early life, both in animals and in children, without there being any consciousness of the aim or design of the blind impulse. Whosoever avers otherwise must have paid very little attention to the gambols of young animals, and must be strangely or hypocritically oblivious of the events of his own early life. It is at puberty that the instinct makes its appearance in the consciousness of man, and thereupon generates knowledge of its aim, and craves for means of gratification; in like manner as, in the course of development through the ages, the blind procreative instinct which is immanent in animal nature finally undergoes a marvellous evolution within human consciousness.

As we have exhibitions of this blind impulse in the healthy child, it is quite natural to look for exaggerated and perverted manifestations of it in the insane child. These we do not fail to meet with: while the enthusiastic idealist is greatly shocked by disgusting exhibitions of unnatural precocity in children of three or four years of age, and exclaims against them as if they were unaccountable and monstrous, they are not without interest to the scientific observer, who sees in them valuable instances on which to base his generalizations concerning man, not as an ideal but as a real being. In the *Philosophical Transactions* for 1745, is the account of a boy, aged only two years and eleven months, who displayed a remarkable sexual precocity. Esquirol quotes the case of a girl, aged three years, who was constantly putting herself into the most indecent attitudes, and used to practise the lewdest movements against any piece of furniture. At first the parents thought nothing particular of it, but finding the practice continued, and of unmistakeable significance, they tried every means in their power to prevent it, but without avail. In church or anywhere at the sight of an agreeable object there was the same abandonment, ending in a general spasm. The child confessed to a positive pleasure from the acts, continued them as she grew up, and, though ultimately married, was a regular nymphomaniac. The greatest salacity was always manifested from the beginning to the end of spring.[*] Other similar examples of this sort of instinctive insanity might easily be adduced. The afflicted child has no true consciousness of the import of its precocious acts; certain attitudes and movements are the natural gesture-language of certain internal states; and it is little more than an organic machine automatically impelled by disordered nerve centres.

(*b*) *Moral Insanity.*—This variety of affective insanity might be illustrated by numerous examples of all degrees of severity, ranging from what might, not without reason, be described as viciousness to those extremer manifestations which pass far beyond the bounds of what any one would call wickedness. In the spring of 1827, Dr. Prichard was asked to see the daughter of a farmer, in some members of whose family insanity existed. She was a little girl, aged seven, and was described as having been quick at apprehension, lively, affectionate, and intelligent A great change, however, took place in her conduct: she became rude, vulgar, abrupt, and perfectly unmanageable; doing no work, running about the fields, and, if rebuked, very abusive and extremely passionate. Her appetite was perverted so that she preferred raw vegetables to her proper food; and she would sleep on the cold and wet ground rather than upon her bed. Her parents had no control over her, and she was persistently cruel to her sisters, pinching them when she could do so without being observed. She had a complete knowledge of persons and things, and recollected all that she had learned. Her eyes glistened brilliantly; the conjunctiva was reddened; her head was hot, her extremities were cold, and her bowels disordered; there was a disagreeable odour of the body. Dr. Prichard took her into his own house, as she was getting worse at home. "At this time she had taken to eat her own fæces, and to drink her urine, and she would swear like a fishwoman and destroy everything within her reach; yet she was fully conscious of everything she did, and generally appeared to know well that she had done wrong." After doing something wrong she would exclaim, "Well, Mrs. H., I have done it. I know you will be angry; but I can't help it, and I could not let it alone until I had." Among her pleasures was that of dirtying herself as frequently as she had clean clothes; indeed, "she would rarely pass her excrements into the proper place, but reserved them for the carpet of the sitting-room, or for her own clean clothes." "At other times she was so far conscious of her situation as to cry bitterly, and express her fears that she would become like her aunt, who was a maniac. In addition to all these indications she had stolen everything which she thought would be cared for, and either hid or destroyed it; and swore in language which it is difficult to imagine that such a child could ever have heard." There was no fixed idea which influenced her conduct; she acted "from the impulse of her feelings, and these were unnatural, and perverted by disease." After two months she recovered.*

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[*] See also Morel's "Études Cliniques sur les Maladies Mentales," 1852.

Haslam relates the following case of a young gentleman, aged ten, in whose ancestors no insanity was admitted. When only two years old, he was so mischievous and uncontrollable that he was sent from home; and until he was nine years old he continued "the creature of volition and the terror of the family," and was indulged in every way: he tore his clothes, broke whatever he could break, and often would not take his food. Severe discipline was tried, but in vain; and the boy was ultimately sent to a lunatic asylum. There was deficient sensibility of the skin. He had a very retentive memory with regard to matters which he had witnessed, but was attracted only by fits and starts, so that he would not learn: he was "the hopeless pupil of many masters," breaking windows, crockery, and anything else which he could break. Whenever the cat came near him he plucked out its whiskers with wonderful skill and rapidity, saying, "I must have her beard off," and then commonly threw the animal on to the fire or through the window. He was quite insensible to kindness, and never played with other boys. "Of his own disorder he was sometimes sensible: he would often express a wish to die, for he said very truly, 'God had not made him like other children;' and when provoked, he would threaten to destroy himself." No improvement took place. A case in some regards similar is quoted by Moreau from Renaudin, under whose care it was:—A boy, whose intelligence and behaviour were usually of an ordinary character, was subject every now and then to a positive mania of acts, without any mental incoherence.† When these attacks came on him he was quite incorrigible, and in consequence of them he had been expelled from several schools. After several unsuccessful trials at discipline, he was at last sent to an asylum. There he answered quite intelligently, but wept and was silent when spoken to about his bad conduct: pressed upon this subject, he said that he could not help it. The interesting circumstance was that there was a complete insensibility of the skin at the time of the attacks of irresistible violence, and that, in his docile and affectionate intervals, the sensibility of the skin was natural. The acts of violence were of so extreme a character that, says the reporter, "we were able to satisfy ourselves that they might go as far as murder."

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* On the Different Forms of Insanity in relation to Jurisprudence, by J. C. Prichard, M.D. 1842.

† Moreau's Psychologie Morbide, p. 313.

These examples may suffice as illustrations of a form of disease which undoubtedly occurs in early life, and which, indeed, is more readily acknowledged when it is met with in such young children than when it is met with in the adult. The extreme acts of precocious wickedness seem so inconsistent with the immaturity of childhood that they are readily accounted unnatural, and are attributed to disease. However, to call them the result of disease is not to explain them, nor to cancel the need of an explanation; and to designate them unnatural is not to remove them from the domain of natural law. Whosoever scrupulously traces these acts as the necessary consequences of certain coefficient causes implied in the vitiated constitution of the nervous element of the child, and thus banishes, as he must do, the notion of witting and wilful vice, will be prepared to recognise the possibility of like physical conditions in the adult being the agents in producing like morbid effects. Instead of dismissing a thing from the mind after labelling it as unnatural or morbid, without being at the pains to attach any definite meaning to such words, it is most necessary to strive to get precise ideas as to its nature and causation, so that, in the event of a similar effect being at some time observed, there may be light thrown upon the hidden causes and true relations, in place of vague or unfounded assumption agreeable only to ignorant prejudice.

What is of the utmost importance to be borne in mind in all cases of affective insanity, and especially of that variety which we have described as moral insanity, is the question of hereditary taint. As the nature of man has been slowly developed into that which it now is by a progressive fashioning through generations, so by a retrograde descent may it pass backwards to a lower stage: the degeneration which the individual who becomes insane without having had any predisposition to insanity represents, may observably become the inherent defect or taint of the nervous element of his progeny, so that the acquired or, as it were, accidental irregularity of the parent determines a natural predisposition to irregular, perverse, and discordant acts in the offspring. The progress of organic development through the ages is a progressive internal specialization in relation to external nature; the human organism, as the highest organic development, has the most special and complex relations with the external; and the highest mental development, as the supreme development of the human organism, represents the completest expression of the most special and complex harmony between man and nature. Now this harmony will plainly be destroyed, and a discord produced instead, by that inherent defect of nervous element which an hereditary taint implies; for it implies, as we have seen, a predisposition to discordant action. Accordingly, there is witnessed in the infant, long before any responsibility attaches to its acts, either a congenital inability to respond to external impressions, whereby idiocy of greater or less degree is the consequence, or a degenerate state of nervous element, whereby the natural assimilation of impressions and the fitting reaction to them are seriously interfered with. In the latter case there is a positive defect in the composition or constitution of nervous element; its degeneration means the loss of its *kind* and the existence of an inferior *kind;* and accordingly its fundamental self-conservative impulse, as living matter of specific quality, is abolished. The strange perversions of the child's appetites and instinctive strivings plainly reveal this; for, instead of displaying an aversion from what is injurious and rejecting it, the young creature positively seizes with eager appetite what is most baneful. In all the degrees and kinds of healthy life we witness in operation the *attraction* of what is suitable to growth and development and *the repulsion* of what is unsuitable: in the lowest forms of life we describe them simply as attraction and repulsion, or assimilation and rejection; as we rise higher in the scale of life the attraction becomes *appetite* and the repulsion becomes *aversion;* higher still the attraction is *desire* or *love*, the repulsion is *dislike* or *hate*, although, if there is any character of uncertainty about the event, *hope* and *fear* are used to express the opposite strivings; and the last and highest development of these fundamental impulses is *willing* and *unwillingness.* But in the child born with a strong predisposition to insanity there is a want of this pre-established harmony between the individual constitution and external nature: the morbid creature devours with eager appetite the greatest trash, and rakes out the fire with its fingers; it desires passionately and frantically struggles for what is detrimental to it, and rejects or destroys what is suitable, and should, were it rightly constituted, be agreeable; it loves nothing but destructive and vicious acts, which are the expressions of an advanced degradation, and hates that which would further its development, and is necessary to its existence as a social being. By reason of its physical constitution it is then a fundamental discord in nature; and all its perverse reactions are the utterances of a gradually proceeding course of deterioration whereby it ultimately goes to destruction: it cannot assimilate nature, and nature will therefore, sooner or later, assimilate it. Meanwhile, as a diseased element in the social organism, it must be isolated or removed for the good of the organism.

As the mad acts of the insane infant or child mark a degenerate state of nerve element, so the degenerate creature itself represents a degenerate variety or morbid *kind* of human being. However low a human being may fall or be brought, he never reverts to the type of any animal; the fallen majesty of mankind being manifest even in the worst wrecks. Certainly there may sometimes be a general resemblance to one of the lower animals, but the resemblance is never anything more than a general and superficial one; all the special differences in mental manifestations are still more or less apparent, just as all the special differences in anatomical structure still remain. The idiot, with hairy back, may go on his knees and "bah" like a sheep, as did one of which Pinel tells; but as he does not get the wool and conformation of the sheep, so he does not get its psychical characters: he is not adapted for the relations of the sheep, and, if placed in them, would surely perish, and he does exhibit unconscious traces of adaptation to his relations as a human being which the best developed animal never would. So also with regard to man's next of kin, the monkeys: no possible arrest of development, no degradation of human nature through generations, will bring him to the special type of the monkey: a degenerate kind of human being may be produced, but it is a *morbid* kind, wanting the instincts of the lower animals, and the unconscious upward aspirations of their nature, as well as the reason of man and his conscious aspirations. It is a very rare thing, for example, to meet among idiots with that instinctive discrimination of poisonous matters which beasts have; on the other hand, it is very common to meet among them with that perverted craving for improper or injurious food, which is in reality the unconscious display of nature's effort to extinguish a morbid variety, and which, but for charitable interference and fostering care, would soon accomplish its aim.

Man exists in an intimate correlation with nature at its present stage of development—is, as it were, the outgrowth at this stage of its evolution, and therefore flourishes well under the existing conditions: the monkey, on the other hand, is not in harmony with the complexity of surrounding nature, and is rapidly becoming extinct, the stronger species surely superseding it. If it were desired to bring man to the monkey level it would be necessary that the latest mighty changes in nature should be undone, and that condition of things restored which prevailed ages before man appeared, and of which the monkey was the natural outgrowth. While, then, the monkey type, and every other pure animal type, represent stages in the upward development of nature, the *theroid* degenerations of mankind are pathological specimens, which, not being serviceable for development, are cast off by the stream of progress, and are on their way to destruction for re-issue by nature under better form. Let them not pass by in their decay, however, without their uses, that we, profiting by the experiments which their failures afford, may form for ourselves true generalizations adapted to the successful conduct of life, and therein the promotion of nature's development. By such examples, nature teaches how best to promote the progress of humanization.

Do not the foregoing considerations render it sufficiently intelligible how it is that we sometimes witness such a precocity of seeming vice in the insane infant or child? Innate in its human constitution is the potentiality of a certain development, the latent power of an actual evolution which no monkey ever has; in it is contained as by involution, or implicitly comprehended, the influence of all mankind that has gone before. When, therefore, such a being is insane, there is not only an individual creature, but there is human nature in perverse action, in retrograde metamorphosis: there are actualized in a morbid display certain potentialities of humanity, and accordingly there are presented exhibitions of degenerate human action, which, so far as regards the individual infant, seem to mark prematurity of vice. Humanity is contained in the individual; and in these strange morbid displays we have an example of humanity undergoing retrograde resolution. In the sense of anything in nature being self-determined and self-sufficing, there is no individuality: as in one word are summed up ages of human cultivation, so in one mortal are summed up generations of human existence. Both in his knowledge and in his nature each one is the inheritor of the acquisitions of the past. Take the word which represents the subtle and, as it were, petrified thought of a high mental culture, and trace back with analytical industry its genesis,—resolve it into its elementary production,—what a succession of human experiences is unfolded! what a gradual process of growth, rising in speciality and complexity up to that organic evolution which the word now marks, is displayed! Take, in like manner, the individual being, and trace back through the long records of ages the antecedent steps of his genesis, or observe rather the resolution of his essential human nature as it is exhibited in the degenerate acts of the insane child—in this experiment thus obtruded on the attention by nature—and there will then be no cause for surprise at phenomena which the young creature could never have individually acquired, and which, so far as its conscious life is concerned, appear strangely precocious and inexplicable. There is the rapid undoing of what has been slowly done through the ages, the irregular morbid manifestation of faculties which have been tediously acquired, the formless ruin of carefully fashioned form.

It will not be amiss to add that the phenomena of the insanity of early life, examined with scrupulous fidelity, confirm in the fullest and most exact manner the general physiological and pathological principles which throughout this work it has been the aim to establish, enforce, and illustrate.

NOTE.

While this sheet was in the press, I have seen an interesting case of insanity in a girl, æt. 14, who is lively, pretty, and intelligent. She suddenly jumps up in a paroxysm of excitement, exclaims, "Mother, I'm dying!" and begins praying frantically. The paroxysm lasts for three or four hours, and leaves her pale, cold, exhausted, and trembling like a leaf. A brother died after being similarly afflicted. The mother has suffered for months from speechless melancholia; and nearly all her family have died from phthisis. She has had fourteen miscarriages and three children, this being the only one left: when carrying her she had a terrible fright from seeing one child accidentally killed, and this girl was born suffering from constant choreic movements, which lasted for six months after birth. Before these paroxysms of excitement came on, she had been subject to periodical attacks of depression with much weeping; and all her life has suffered more or less from pain in the head, especially in the left temple.

CHAPTER III.

VARIETIES OF INSANITY.

THERE are certain mild forms of Insanity, or rather certain eccentricities of thought, feeling, and conduct, that scarcely reach the degree of positive insanity, which not unfrequently cause great difficulty when the question of legal or moral responsibility is concerned. Many people who cannot be called insane, notably have what may be called the insane temperament,—in other words, a defective or unstable condition of nerve element, which is characterised by the disposition to sudden, singular, and impulsive caprices of thought, feeling, and conduct. This condition, in the causation of which hereditary taint is commonly detectable, may be described as the *Diathesis spasmodica*, or the *Neurosis spasmodica.*

1. *The Insane Temperament, or Neurosis spasmodica.*—It is characterised by singularities or eccentricities of thought, feeling, and action. It cannot truly be said of any one so constituted that he is mad, but he is certainly strange, or "queer," or, as it is said, "not quite right." What he does he must often do in a different way from all the rest of the world. If he thinks about anything, he is apt to think about it under strange and novel relations, which would not have occurred to an ordinary person; his feeling of an event is unlike that which other people have of it. He is sometimes impressionable to subtle and usually unrecognised influences; and now and then he does whimsical and apparently quite purposeless acts. There is in the constitution an innate tendency to act independently as an element in the social system, and there is a personal gratification in the indulgence of such disposition, which to lookers-on seems to mark great self-feeling and vanity. Such a one, therefore, is deemed, by the automatic beings who perform their duties in the

social system with equable regularity, as odd, queer, strange, or not quite right.

This peculiarity of temperament, which undoubtedly predisposes to insanity, does nevertheless in some instances border very closely upon genius; it is the condition of the talent or wit which is allied to madness, only divided from it by thin partitions. The novel mode of looking at things may be an actual advance upon the accepted system of thought; the individual may be in a minority of one, not because he sees less than, or not so well as, all the world, but because he happens to see deeper, or to be favoured with a flash of intuitive insight. He may differ from all the world, not because he is wrong, and all the world is right, but because he is right, and all the world is wrong. Of necessity every new truth is at first in a minority of one; it is a rebellion against the existing system of belief; accordingly the existing system, ever thinking itself a finality, strives with all the weight of its established organization to crush it out. But by the nature of things that must happen, whether the novelty be a truth or an error. After all, it is only through the appearance of rebels in the social system that progress is effected; and precisely because individuality is a reproach, and sneered at as an eccentricity, is it well for the world, as Mr. J. S. Mill has said, that individuality or eccentricity should exist.* It may be advisable to set this matter forth at greater length, to the end that we may, if possible, get a just conception of the real relation of certain sorts of talent to insanity.

The genius is always recognised to be in the van of his age; in that wherein he is in advance, he necessarily differs from his age, and is often enough therefore pronounced mistaken, unpractical or mad: in that wherein he agrees with his age, he is necessarily not original; and so appears the truth of an observation of Goethe, that genius is in connexion with its century only by its defects—that in which there is not genius. Certainly the originality of a man of true genius will grow out of the existing system, may be traced as a genetic evolution of it; he is therefore in radical connexion with his century; but the more advanced his development, the more he will outshoot and differ from his age. Accordingly, many a man of genius—who has appeared before his time, or, in other words, before the social organism has reached that stage of evolution represented by him—has been forgotten, having most likely been thought more or less mad in his lifetime; and the person who usually gets most reputation, and whose name is made to mark an epoch in development, is he who systematizes and definitely sets forth—that is, brings into illuminated consciousness—the method which mankind has for some time been instinctively or unconsciously pursuing: a Bacon and a Comte, being in reality not much in advance of their centuries, but having eyes to discern the tendency of development, and a capacity of coordinating knowledge, are those who get the most honour. But even these men are not honoured so much by their own age as by a posterity which has developed up to their level. We never know how high the mountain is until we get some distance from it.

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* Essay on Liberty.

An inherent disposition of nervous constitution, rendering a man dissatisfied with the existing state of things, and impelling him to novel strivings, is really an essential condition of originality: to suffer greatly, and to react with corresponding force, is a means of dragging the world forward at the cost of individual comfort. Consider, however, what an amount of innate power a man must have in order to do that, without himself sinking under the huge weight of opposition! Many earnest and intense reformers, whose vital energies have been absorbed in the promulgation of one truth, which was perhaps an important one, have notoriously broken down in face of the crushing force of the organized opposition. They have been so abandoned to their idea, so carried away by it, so blind to the force of the circumstances with which they have had to contend, so one-sided and fanatical, as to be almost as inconsiderate of the manifold relations of their surroundings as actual madmen are; and accordingly they have often been called, and sometimes perhaps were, mad. Certainly their failures prove that they had not sufficient insight, patience, and capacity for the task which they had undertaken; that they did not succeed, was because they did not deserve to succeed. Whatever the will, there was not in their nature the capacity to establish an equilibrium between them and external conditions. They could not mould circumstances agreeably to their wish; they could not accommodate themselves to circumstances; they were inevitably, therefore, the victims.

It is undoubtedly true, that where hereditary taint exists in a family, one member may sometimes exhibit considerable genius, while another is insane or epileptic; but the fact plainly proves no more than that in both there has been a great natural sensibility of nervous constitution which, under different outward circumstances, or internal conditions, has issued differently in the two cases. Now we may properly look at the functional manifestations of unstable nerve element from two different aspects—first, as regards the reception of impressions; and, secondly, as regards the reaction outwards. In the first case, for example, we may have one who is equal to the ordinary events of a calm life, but who, possessing no reserve power, breaks down under the stress of adverse events. And yet his extreme nervous susceptibility may render him capable of slighter shades and subtler delicacies of feeling and thought than a more vigorously constituted being is. The defect, then, is in some respects an advantage, although a rather perilous one, for it may approach the edge of madness: such men as Edgar Allan Poe and De Quincey illustrate this great subtlety of sensibility, amounting almost to disease, and so far give some colour to the extravagant assertion of a French author (Moreau de Tours), that a morbid state of nervous element is the condition of genius. It should not be lost sight of, however, that any one so constituted is nowise an example of the highest genius; for he lacks, by reason of his great sensibility, the power of calm, steady, and complete mental assimilation, and must fall short of the highest intellectual development. Feeling events with a too great acuteness, he is incapacitated from the calm discrimination of the unlike in them, and the steady assimilation of the like, by which the integration of the highest mental faculties is accomplished,—by which, in fact, the truly creative imagination of the greatest poet and the powerful and almost intuitive ratiocination of the greatest philosopher are fashioned. His insight may be marvellously subtle in certain cases, but he is not sound and comprehensive. Although it might be said, then, by one not caring to be exact, that the genius of an acutely sensitive and subjective poet denoted a morbid condition of nerve element, yet no one, after a moment's calm reflection, would venture to speak of the genius of such as Shakespeare, Goethe, and Humboldt, as arising out of a morbid condition.* The impulse which instigates these men to their superior striving, is not so much one of dissatisfaction as one of non-satisfaction—a craving, in fact, for appropriation: the internal potentialities display their endeavour towards realization through the concurrence of suitable external impressions by a feeling of want, a craving, or an unsatisfied instinct—not otherwise than as the lower organic elements manifest their sense of hunger, or as the sexual instinct reveals its want at puberty. The difference between the desires which are the motives to action of the highly endowed, well-balanced nature of the genius, and the desires which instigate the eccentric and violent acts of the incipient madman, is indeed very much the difference between the natural feeling of hunger in the healthy organism, and the perverted appetite for garbage and dirt which the hysterical person occasionally displays. In the former case the aspiration is sound, and directed towards perfecting a harmony between the individual and nature; in the latter, it is unsound, and tends to the production of an irreconcilable discord.

A no less important difference between the highly-endowed nerve element of the genius and the morbid nerve element of the hereditary madman will be apparent when we look to the reactive, instead of the receptive, side. The difference is not unlike that which there is between a quiet aim-working volitional act and a spasmodic movement. The acts of the genius may be novel, transcending the automatic routine of the established system; but, however original and startling they may appear to those who are, as it were, automatic elements in the social organization, they contain, consciously or unconsciously, well-formed design: there are in them an intuitive recognition of and an intelligent respondence to outward relations; in other words, they are aim-working for the satisfaction of an inherent impulse, which operates none the less wisely because there may not be a distinct consciousness of its nature and aim. *Inspiration* is the exact opposite in this regard of *habit* or *custom*—that "tyrant custom" which so completely enslaves the whole manner of thought and action of the majority of men: in the inspiration of a great thought or deed there is the sudden starting forth into consciousness of a new combination of elements unconsciously present in the mind; these having been steadily fashioned and matured through previous experience. The acts of the person who has the evil heritage of an insane temperament are, on the other hand, purposeless, irregular, and aim at the satisfaction of no beneficial desire; they tend to increase that discord between him and nature of which the purposeless acts are themselves evidences, and they must ultimately end in his destruction.

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* "So far from the position holding true, that great wit (or genius, in our modern way of speaking) has a necessary alliance with insanity, the greatest wits, on the contrary, will ever be found to be the sanest writers. It is impossible for the mind to conceive of a mad Shakespeare. The greatness of wit, by which the poetic talent is here chiefly to be understood, manifests itself in the admirable balance of all the faculties. Madness is the disproportionate straining or excess of any one of them."—*Sanity of True Genius*, by Charles Lamb.

I have thus lingered upon the relations which a form of talent bears to insanity, in order to exhibit, if possible, the position of each in the social organization. In both cases there may be an uncommon deviation from the usual course of things; but in one case there is the full recognition of the existing organization as the basis of a higher development, a fusing of the past through a new mould into the future; in the other, there is a capricious rebellion, as the initiation of a hopeless discord. A man of deep insight and comprehensive view may penetrate beneath the masks of things, and see into the real nature of many of the delusions set up by common consent to be worshipped, but he still finds a real truth and meaning beneath the fleeting phenomena, and he accepts with equanimity the present, not as the end, but as means to an end, perceiving in it the prophecy of a completer future: he can subordinate his self-hood to the system, works quietly and sincerely in his sphere, and is moved by no passion springing from offended self-feeling to set the world violently right. The man of great self-feeling, on the other hand, may with penetrating insight recognise the incompleteness, inadequacy, or vanity of many existing phenomena, but he is too apt to find the whole ridiculous, not having sufficient perception to discern the genuine truth which lies in all these apparent shams; he deems himself thoroughly emancipated when he is actually the unconscious slave of an extravagant self-feeling, through which he is made angry with the comedy of life, or passionately earnest to set the world right with a onesided vehemence: there is the reaction of a great self-love which incapacitates its possessor, or rather its victim, from subordinating his personality to the laws of the existing organization. Has not Goethe, as usual, admirably put this truth in the words, "The man of understanding finds almost everything ridiculous; the man of reason hardly anything?"

Where the heritage of the insane temperament exists, it will of course depend much on the internal bodily conditions and the external circumstances of life whether the mischief shall remain latent or issue in positive insanity. Under favourable circumstances it may declare itself only in harmless eccentricities and singular caprices; but if the individual is placed under conditions of great excitement, or subjected to a severe mental strain, the inherent propensity is apt to display itself in some impulsive act of violence. The great internal commotion produced in young girls at the time of puberty is well known to be an occasional cause of strange morbid feelings and extraordinary acts; and this is especially the case where the insane temperament exists. In such case also irregularities of menstruation, always apt enough to disturb the mental equilibrium, may give rise to an outbreak of mania, or to extreme moral perversion more afflicting to the patient's friends than mania, because seemingly wilful. The stress of a great disappointment, or any other of the recognised causes of mental disease, will meet with a powerful co-operating cause in the constitutional predisposition. On this matter, however, enough has already been said, when treating of the causation of insanity.

It remains only to add here—what should not be lost sight of—that a morbid hereditary taint frequently impresses its stamp on the individual's character and conformation in a much more decided manner than by eccentricities of conduct which are compatible with considerable talent. "This fatal heritage," Esquirol wrote, "is painted upon the physiognomy, on the external form, on the ideas, the passions, the habits, the inclinations of those who are the victims of it." In these extremer cases the physiognomy has not the regularity and harmony of beauty; there is, perhaps, an irregular conformation of the head; a vicious implantation of the ears, or a deformity of one or both of them, is not uncommon; convulsions may occur in early life, or there are tics and spasmodic movements in after life; the walk is uncertain, vacillating in extreme cases, and there is sometimes a disproportion between the limbs. Arrest of development of the sexual organs is not very uncommon; slight diseases readily take on a fatal character, so little is the power of vital resistance; and the mean duration of life among those strongly marked by this fatal heritage is less than the average. There are corresponding peculiarities of disposition: Morel of Rouen, to whom we are most indebted for the scientific investigation of this subject, describes these victims as purely instinctive beings; they display instinctively certain remarkable talents, as for music, drawing, calculation, or exhibit a prodigious memory for details; but they are incapable of sustained thought and work—they cannot bring anything to a steady perfection, "do not know that they know, do not think that they think;" and under any great strain they are almost certain to break down into desperate insanity, or to explode in an act of extravagant violence. As the result of his elaborate researches, Morel comes to the conclusion that "in the inferior varieties of degenerate beings a like physical type is to be observed amongst all the individuals that compose these varieties, and a certain conformity in their intellectual and moral tendencies. They betray their origin by the manifestation of the same character, the same manners, the same temperament, the same instincts. These analogies establish amongst degenerate individuals under the same causes the bond of a pathological relationship.' Forget not that between the extreme forms of this degeneracy and those slight eccentricities compatible with high talent there are to be met with cases marking every shade of the long gradation.

Thus much concerning those peculiarities of temperament which do not reach the degree of positive insanity, although they strongly predispose to it. I shall now go on to treat of the different varieties of actual mental disease. On a general survey of the symptoms of these varieties it is at once apparent that they fall into two well-marked groups: one of these embracing all those cases in which the mode of *feeling* or the *affective* life is chiefly or solely perverted—in which the whole habit or manner of feeling, the mode of affection of the individual by events, is entirely changed; the other, those cases in which *ideational* or *intellectual* derangement predominates. More closely scanning the character and course of the symptoms, it will be seen that the affective disorder is the fundamental fact; that in the great majority of cases it precedes intellectual disorder; that it co-exists with the latter during its course; and that it frequently persists for a time after this has disappeared. Esquirol rightly then declared "moral alienation to be the proper characteristic of mental derangement." "There are madmen," he says, "in whom it is difficult to find any trace of hallucination, but there are none in whom the passions and moral affections are not perverted and destroyed. I have in this particular met with no exception." To insist upon the existence of delusion as a criterion of insanity is to ignore some of the gravest and most dangerous forms of mental disease.

2. *Affective Insanity.*—The feelings mirror the real nature of the individual; it is from their depths that the impulses of action spring; the function of the intellect being to guide and control. Consequently when there is perversion of the affective life, there will be morbid feeling and morbid action; the patient's whole manner of feeling, the mode of his affection by events, is unnatural, and the springs of his action are disordered; and the intellect is unable to check or control the morbid manifestations, just as, when there is disease of the spinal cord, there may be convulsive movement, of which there is consciousness, but which the will cannot restrain. In dealing with this kind of derangement, it will be most convenient, as in the investigation of the insanity of early life, to distinguish two varieties—impulsive or instinctive insanity, and moral insanity proper.

(*a*) *Impulsive Insanity.*—Fixing their attention too much upon the impulsive act of violence, to the neglect of the fundamental perversion of the feelings which really exists, many writers appear to have helped to increase the confusion and uncertainty which unfortunately prevail with regard to these obscure varieties of mental disorder. Already it has been pointed out, at sufficient length, that the first symptom of an oncoming insanity commonly is an affection of the psychical tone,—in other words, a perversion of the whole manner of feeling; and what we have here to fix in the mind is that *the mode of affection* of the individual by events is entirely changed: this is the fundamental fact, from which flow as secondary facts the insane impulses, whether erotic, homicidal, or suicidal. The result of the abnormal condition of nerve element is to alter the mode of feeling of impressions: in place of that which is for the individual good being agreeable, and exciting a correspondent desire, and that which is injurious being painful, and exciting an answering desire to eschew it, the evil impression may be felt and cherished as a good, and the good impression felt and eschewed as an evil. There are not only perverted appetites, therefore, but there are perverted feelings and desires, rendering the individual a complete discord in the social organization: the morbid appetites and feelings of the hysterical woman and the singular longings of pregnancy are mild examples of a perversion of the manner of feeling and desire, which may reach the outrageous form of morbid appetite exhibited by the pregnant woman who killed her husband and pickled his body in order to eat it. The sexual appetite may exhibit strange and painful perversions, which again of necessity involve the destruction of all those finer feelings of affection and propriety in the social system that are based upon it; for it is impossible that natural and healthy love should co-exist with morbid lust. The morbid perversion of feeling may be general, so that all sorts and conditions of abnormal feelings and desires are exhibited, or it may be specially displayed in some particular mode, so that one persistent morbid feeling or desire predominates. In the latter case we have such instances of madness as those in which there is a persistent morbid desire to be hanged, and the victim of the diseased feeling is actually impelled to a homicidal act to satisfy his unnatural craving; or, again, such insanity as that of the father or mother who kills a child with the sincere purpose of sending it to heaven. The act of violence, whatever form it may take, is but the symptom of a deep morbid perversion of the nature of the individual, of a morbid state which may at any moment be excited into a convulsive activity, either by a powerful impression from without producing some great

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moral shock, or by some cause of bodily disturbance—intemperance, sexual exhaustion, masturbation, or menstrual disturbance. There are women, sober and temperate enough at other times, who are afflicted with an uncontrollable propensity for stimulants at the menstrual period; and every large asylum furnishes examples of exacerbation of insanity or epilepsy coincident with that function. In fact, where there is a condition of unstable equilibrium of nerve element, any cause, internal or external, exciting a certain commotion, will upset its stability, just as happens with the spinal cord under similar circumstances. By his acts, as well as by his speech, does man utter himself; gesture-language is as natural a mode of expression as speech; and it is in insanity of action that this most dangerous form of affective insanity is expressed—most dangerous indeed, because so expressed.

Amongst numerous examples that might be quoted of this form of insanity, in order to illustrate different uncontrollable impulses—suicidal, homicidal, erotic, or of other kind—it shall suffice here to adduce three cases, all of which came under my observation and treatment. The first is an instance of irresistible suicidal impulse:—

A married lady, aged thirty-one, who had only one child a few months old, was for months afflicted with a strong and persistent suicidal impulse, without any delusion or any disorder of the intellect. After some weeks of zealous attention and anxious care from her relatives, who were all most unwilling to send her from among them, it was found absolutely necessary to send her to an asylum, so frequent were her suicidal attempts, so cunningly devised, and so determined. On admission she was very wretched because of her frightful impulse, and often wept bitterly, deploring the great grief and trouble which she caused to her friends. She was quite rational, even in her great horror and reprobation of the morbid propensity; and all the fault that could possibly be found with her intellect was, that it was enlisted in the service of the morbid impulse. She had as complete a knowledge of the character of her insane acts as any indifferent bystander could have, but she was completely powerless to resist them. Nevertheless, her attempts at suicide were unceasing. At times she would seem quite cheerful, so as to throw her attendants off their guard, and then would make with quick and sudden energy a pre-contrived attempt. On one occasion she secretly tore her night-dress into strips while in bed, though an attendant was close by, and was detected in the attempt to strangle herself with them. For some time she endeavoured to starve herself by refusing all food, and it was necessary to feed her with the stomach-pump. The anxiety which she caused was almost intolerable, but no one could grieve more over her miserable state than she did herself. Sometimes she would become cheerful and seem quite well for a day or two, but would then relapse into as bad a state as ever. After she had been in the asylum for four months, she appeared to be undergoing a slow and steady improvement, and it was generally thought, as it was devoutly hoped, that one had seen the last of her attempts at self-destruction. Watchfulness was somewhat relaxed, when one night she suddenly slipped out of a door which had been carelessly left unlocked, climbed a high garden-wall with surprising agility, and ran off to a reservoir of water, into which she threw herself headlong. She was got out before life was quite extinct; and after this all but successful attempt she never made another, but gradually regained her cheerfulness and her love of life. Her family was saturated with insanity. In face of such an example of uncontrollable impulse, what a cruel mockery it is to measure the lunatic's responsibility by his knowledge of right and wrong!

Cases belonging to the same class as the foregoing, but in which the impulse was homicidal, have been recorded by many different observers. The following example occurred in my practice:—An old lady, aged seventy-two, who had several members of her family insane, was afflicted with recurring paroxysms of convulsive excitement, in which she always made desperate attempts to strangle her daughter, who was very kind and attentive to her, and of whom she was very fond. Usually she sat quiet, depressed, and moaning because of her condition, and was apparently so feeble as scarcely to be able to move. Suddenly she would start up in great excitement, and, shrieking out that she must do it, make a rush upon her daughter that she might strangle her. During the paroxysm she was so strong, and writhed so actively, that one person could not hold her; but after a few minutes she sank down quite exhausted, and, panting for breath, would exclaim, "There, there! I told you; you would not believe how bad I was." No one could detect any delusion in her mind; the paroxysm had all the appearance of a mental convulsion; and had she unhappily succeeded in her frantic attempts, it would certainly have been impossible to say honestly that she did not know that it was wrong to strangle her daughter. In fact, it was because of her horrible propensity to so wrong an act that she was so wretched. It is a sufficiently striking commentary on the present state of the English law to add that, had this patient succeeded in taking her daughter's life, sentence of execution must have been passed, and might have been carried into effect, notwithstanding she was so entirely insane and irresponsible.

In the Report of the Morningside Asylum for 1850, Dr. Skae relates a somewhat similar case of a female who was tormented with "a simple abstract desire to kill, or rather (for it took a specific form) to strangle," without any disorder of the intellectual powers, and who "deplored, in piteous terms, the horrible propensity under which she laboured."

The next case may serve to illustrate a multitude of insane acts, without corresponding intellectual disorder: there was not the impulse to any particular insane act, but there were various perverted feelings and many impulses to different strange and foolish acts. A young lady, aged twenty-nine, of good appearance and manners, and well connected, was, after long patient trial at home, sent to an asylum. From the age of twenty-two there had been a tendency to lowness of spirits without apparent cause. Lately she had become worse, and was now described as wilful, impulsive, passionate, and as having lost all affection for her parents, though formerly most affectionate and amiable. Her habit of body was sluggish, the circulation being languid and the extremities often cold and livid; menstruation was very irregular. She complained of feeling strange, quite unlike herself, and ill, and would buy all kinds of queer compounds at the chemist's, and take them; sometimes she wrapped a wet sheet round her body, and then put her clothes on over it. She entertained a very high opinion of her talents, and was exceedingly vain, seeming to think herself a peculiar person, and angrily complaining that she was treated most shamefully if her inclinations were anywise thwarted. And her inclinations were peculiar, and suddenly manifested: she would all of a sudden scale a high garden wall and run off into the fields, or sit down by the roadside when walking out, and refuse to move for a long time, or stand still in the middle of the road, or jump up in the middle of the service and walk out of church. She was continually writing letters to her parents, relatives, and people whom she did not know, complaining of her confinement, sometimes angrily, at other times humorously. Usually the letters were not finished, but broken off abruptly, sometimes in the middle of a sentence, and sent for posting: one was addressed to "Tout le Monde." The letters often contained very clever and vigorous remarks, but the sentences were rarely connected, each one being, as it were, an independent shot; as the thought came automatically into the mind, so it was automatically expressed. Now and then she would refuse to take any food for a day or two, and at other times would eat far more than was good for her. She always exhibited extreme religious feeling, was fond of distributing tracts as she went along the road, and would sometimes read to the unfortunate patients who were more severely afflicted; notwithstanding which benevolence, however, she would, if she had not the exact seat at church which she might happen to desire, burst into tears and sob with passion, or rise up in the midst of the service and walk quietly out; at other times she would not move after the service was over, notwithstanding all the entreaties and reproaches of those who attended upon her. Adjured beforehand to behave properly, she would promise to try to do so; remonstrated with at the time of her extravagances, or after she had indulged in them, the reply usually was that her motives were not understood; although when in a better mood she confessed that she was a great trouble, acknowledged the attention which she received, and said that she was prompted by Satan; sometimes she wished heartily some one would give her a good beating so as to rouse her from her apathy. If any reason was given for her impulsive deeds at the time, it usually was that "it was revealed to her" that she was to do so; and it is remarkable that, though usually overcome with languor, and looking as if scarcely able to move, she would, when the impulse seized her, scale a high brick wall with a cat-like agility, though she seemed to have no definite notion what she was going to do when she had got over, and had run for a certain distance. In all her conduct she exhibited an odd combination of reason of thought and of dementia of action; a stranger conversing with her would not have discovered that she ailed anything at all: there were good natural endowments and general correctness of thought with hopeless dementia of action; any one living with her for a time could not fail to perceive how exceedingly insane she really was. Although hereditary taint was denied, yet it ultimately turned out that two other near relatives were in confinement, and incurably insane,—a fact which might have been predicted with some confidence from the character of her disease. The idea which arose in the mind as the motive impulse of her singular deeds came not by any regular process of conscious association; it appeared as the result of cerebral activity in the recesses of the unconscious mental life; the unconscious nature, as so often happens in every one's life, surprised and overpowered the conscious life. The idea thus starting automatically into sudden activity appeared to her verily as a revelation from heaven or an impulse from Satan; and the action which it dictated was scarcely more within control than the sudden spasm of chorea, or the convulsion of epilepsy.

The foregoing cases may be accepted as typical examples of different forms of impulsive insanity. In each of them there was a strong hereditary taint, as indeed there commonly is in this convulsive form of mental disease; but other causes may give rise to a singular morbid state without any hereditary taint being positively detectable. Irregularities of menstruation sometimes produce severe disorder of nerve element, giving rise in one person to hysterical convulsions or hysterical mania, in another to epilepsy, and in another to violent suicidal or homicidal impulse. A woman who was in the deepest despair because she was afflicted with the idea that she must murder her children, and frequently ran actively up and down stairs so as to endeavour to drive away the idea by producing exhaustion, perfectly recovered on the return of the menses, which had stopped. "We have, amongst others," says Dagonet, "observed a patient who was seized at each menstrual period with violent impulses. Under the influence of this disposition she had killed her three children a short time before her arrival at Stephansfeld."* The degeneration of nerve element induced by habits of self-abuse, or by great sexual excesses, sometimes manifests itself in the dangerous form of impulsive insanity. Lallemand relates several striking cases in which patients suffering from spermatorrhœa were afflicted with painful homicidal and suicidal impulses.

The most desperate examples of homicidal impulses are undoubtedly met with in connexion with epilepsy. Sometimes an attack of mania notably precedes an epileptic fit or a series of epileptic fits; but it is not so clearly understood that the mental derangement so occurring may have the form of profound moral disturbance with homicidal propensity, but without manifest intellectual derangement. A shoemaker was subject to severe epileptic fits, and was often furious for a while immediately after them; but in the intervals he was sensible, amiable, and industrious. One day, when in the gloomy and morose frame of mind that often foretells an attack of epileptic fits, he met the superintendent of the asylum, to whom he was much attached, and stabbed him to the heart. He had not had a fit for three weeks, but in the night following his homicidal deed he had a severe fit, and for some time the attacks continued to be frequent and severe. In such cases, as indeed in the above case, there are often sudden and vivid temporary hallucinations. Again, the mental disorder which sometimes takes the place of an epileptic attack, representing in fact a *masked* epilepsy, may appear as simple impulsive insanity. A peasant, aged twenty-seven, had suffered from epilepsy since he was eight years old; but when he was twenty-five the character of his disease changed, and instead of epileptic attacks he was seized with an irresistible impulse to commit murder. He felt the approach of his attack sometimes for days beforehand, and then begged to be restrained in order to prevent a crime. "When it seizes me," he cried, "I must kill some one, were it only a child." Before the attack he complained of great weariness; he could not sleep, felt much depressed, and had slight convulsive movements of his limbs.†

Because the general perversion of the whole manner of *feeling* which exists in all these cases has commonly been so completely overlooked, attention being fixed exclusively on the morbid *act*, a great resistance has been excited in the public mind to the admission of what seemed to be the dangerous theory of instinctive insanity. The word "instinctive," again, is not well chosen; it naturally seems absurd to imply that there is in man an instinct to commit homicide or suicide. Moreover, it is quite evident in some cases of impulsive insanity that there is present in the mind of the sufferer the *idea* that he must kill some one: he is conscious of the horrible nature of the idea, struggles to escape from it, and is miserable with the fear that it may at any moment prove too strong for his will, and hurry him into a deed which he dreads, yet cannot help dwelling upon. So desperate sometimes is the fear of yielding to the morbid impulse, so intense the horror of doing so, and so extreme the mental suffering, that a mother, afflicted with the impulse to kill her child, has killed herself to prevent a worse consummation. It happens, sometimes, that the patient succeeds in controlling the morbid idea for a time, calls up other ideas to counteract it, warns his probable victim to get out of the way, or begs earnestly to be himself put under some restraint; but at last, perhaps from a further deterioration of nervous element through bodily disturbance, the morbid idea acquires a fatal predominance; the tension of it becomes excessive; it is no longer an *idea* the relations of which the mind can contemplate, but a violent *impulse* into which the mind is absorbed, and which irresistibly utters itself in action. As showing how artificial are the divisions commonly made between different kinds of insanity, and as illustrating at the same time the state of the affective life in impulsive insanity, it may not be amiss to remark here, that while we should describe the profoundly depressed patient struggling with his morbid idea as suffering from *melancholia*, we usually designate his disease *impulsive insanity* when he is hurried into action by the intensity of the morbid idea. The fact that a person so afflicted can, and sometimes does, resist the diseased idea or impulse, causes many to think, and some to argue, that it might always be successfully resisted. In reality, however, it is a simple question of the degree of morbid degeneration of nerve element, whether the idea shall remain in consciousness and be under subjection, or become uncontrollable and realize its energy in action. By an act of the will a person may prevent involuntary movement of his limbs when the soles of his feet are tickled, but the strongest will could not prevent spasmodic movements of the limbs when the excitability of the spinal cord is increased by strychnia or disease. It is impossible that true conceptions of mental disease can be acquired until men cease to regard its phenomena entirely from a psychological point of view, and consent to study them by aid of the established principles of physiology and pathology: the despair of any one writing upon mental diseases at present is, that he cannot convey just and adequate ideas of them by any care or labour of expression so long as men will judge them by the revelations of self-consciousness. Such practice is not one whit less absurd than it would be to form conclusions with regard to convulsions on the basis of the recognised power of the will over voluntary movements.

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* Traité Élémentaire et Pratique des Maladies Mentales, par H. Dagonet, 1862.

† De la Folie considérée dans ses Rapports avec les Questions Médico-judiciaires, par C. C. H. Marc.

Once more let it be distinctly affirmed, that the morbid condition of nerve element, of which the morbid impulse to a violent deed is a marked symptom, is not less certainly evidenced by a general perversion of feeling or of the affective life. It is the violence and suddenness of the outward reaction in impulsive insanity which tends to mask the less patent symptoms of affective derangement.

(*b*) *Moral Insanity.*—Here the moral perversion is very evident and cannot be overlooked, while the outward reactions of the individual are less convulsive in their manifestations, and answer more exactly to the morbid feelings and desires, than is the case in impulsive insanity. Hence it is so difficult to induce the public to entertain the idea that moral insanity is anything more than wilful and witting vice. Much as the assumption of it as a disease has been reprobated, there can be no doubt that all the eminent men who have studied insanity, and whose authority we habitually accept, are entirely agreed as to the existence of a form of mental disorder in which, without any hallucination, illusion, or delusion, the symptoms are exhibited in a perverted state of those mental faculties usually called the active and moral powers, or included under feeling and volition —the feelings, affections, propensities, temper, habits, and conduct. As, however, feeling is more fundamental than cognition, the intellectual activity cannot be entirely unaffected, though there may certainly not be any positive delusion: the whole manner of thinking and reasoning is tainted by the morbid self-feeling through which it is secondarily affected. The patient may judge correctly of the relations of external objects and events, and may reason very acutely with regard to them, but no sooner is self deeply concerned, his real nature touched to the quick, than he displays in his reasoning the vicious influence of his morbid feelings and an answering perversion of conduct: he cannot truly realize his relations, and his whole manner of thought, feeling, and conduct in regard to himself is more or less false. In a great many cases, where this disordered condition of mind is met with, it will be found to precede an outbreak of unquestioned insanity—indeed, we might almost say that in more or less marked form it precedes nearly every attack of insanity; while in other cases it will be found to be a condition persisting for a time after all the intellectual derangement of an attack of madness has disappeared. The disappearance of hallucination or delusion only becomes a sure sign of convalescence when the patients return at the same time to their natural healthy feelings.

When moral insanity is thought to exist by itself, and to constitute the disease, as it certainly may do, it would be quite unjustifiable to assume that a particular vicious act or crime, or a series of vicious acts, proved its existence; in the previous history of the patient there will be evidence of a sufficient cause of disease having been followed by an entire change of manner, of feeling, and acting: the vicious act or crime will be logically traceable through a chain of symptoms to disease as cause, as the acts of the sane man are traced to or deduced from his desires and motives. "There is often," says Dr. Prichard, who first called attention to this form of mental derangement, "a strong hereditary tendency to insanity; the individual has previously suffered from an attack of madness of a decided character; there has been some great moral shock, as a loss of fortune; or there has been some severe physical shock, as an attack of paralysis or epilepsy, or some febrile or inflammatory disorder, which has produced a perceptible change in the habitual state of the constitution. In all these cases there has been an alteration in the temper and habits."*

When compelled to give an opinion upon a particular case of suspected moral insanity, it is of some importance to bear in mind that the individual is a *social* element, and to have regard therefore to his social relations. That which would scarcely be offensive or unnatural in a person belonging to the lowest strata of society—and certainly nowise inconsistent with his relations there—would be most offensive and unnatural in one holding a good position in society, and entirely inconsistent with his relations in it: words which, used in the latter case, would betoken grave mental disorder, may be familiar terms of address amongst the lowest classes. Between individuals, as elements in the social organism, there is in this regard a difference not unlike that which there is between the different kinds of organic elements in the bodily organism; it is important, therefore, that we have in remembrance the individual's social relations when dealing with moral insanity, as we regard the very different relations of an epithelial cell and a nerve cell when dealing with structures so far apart in the scale of life. As it is chiefly in the degeneration of the social sentiments that the symptoms of moral insanity declare themselves, it is plain that the most typical forms of the disease can only be met with in those who have had some social cultivation.

The following cases, which came under my observation and treatment, may stand here as examples of a mental perversion which it would seem impossible to describe as other than moral insanity:—

Miss A. B., aged thirty-eight, was the only child of indulgent parents, in high social position and wealthy. Her father was harmlessly insane, nearly imbecile, and it was necessary, after every means of controlling her at home had been tried in vain, to send her to an asylum. She was completely given over to drinking spirits when she could get them, and would bribe the servants or any one else she could bribe to buy spirits for her: nor was she capable of any self-restraint in other regards, making no scruple to indulge whatever passion she found means of indulging. When excited she was extremely violent in conduct, and on more than one occasion threatened her father's life with a pistol. When she could not get spirits, she was abusive, mischievous, quarrelsome, full of complaints of the injustice done to her, and truly intolerable. In the asylum she was the cause of endless disturbances, continually making complaints against the attendants, ingeniously perverting and exaggerating real facts so as to make of them monstrous iniquities, doing the most mischievous things for the sole purpose of giving trouble and annoyance to the servants, and delighted with her success; sometimes she would refuse to take her food, and at the same time would bribe the attendant to secrete it for her so that she might take it without any one else knowing. Removed from the asylum, partly in consequence of her manifold complaints, she was tried at home unsuccessfully, then sent back to the asylum, where she went on just as before, removed again after a time, sent to a different asylum, taken away from that, and sent again to another; indeed, her wanderings were many, and she was the hopeless patient of every doctor who had the misfortune to have anything to do with her.

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* A Treatise on Insanity and other Disorders of the Mind, by J. C. Prichard, M.D.

Miss C. D., æt. forty-five, was a cousin of the above patient, and also of good social position. Her appearance was anything but attractive; she was withered, sallow, blear-eyed, with an eminently unsteady and untrustworthy eye. So improper and immoral was her conduct, that she was obliged to live apart from her family in lodgings; for she seemed incapable, in certain regards, of any control over her propensities. Whenever she was able, she left her lodgings to spend days together at a brothel with a common fellow, whom she supplied with money, frequently pawning her clothes for that purpose. When at home, she generally lay in bed for most of the day. No appeal was of any avail to induce her to alter her mode of life. She was prone to burn little articles, impulsively throwing them into the fire, saying that she could not help it, and then cutting and pricking her own flesh by way of penance. Now and then she would all of a sudden pirouette on one leg, and throw her arms about; and, with like sudden impulsiveness, would not unfrequently break a pane of glass. When reasoned or remonstrated with about her foolish tricks, she professed to feel them to be very absurd, expressed great regret, and talked with exceeding plausibility about them, as though she were not responsible for them, but were an angel in difficulties, which she could not overcome. It was of no use whatever speaking earnestly with her, for she admitted her folly to a greater extent than accusation painted it, and spoke of it with the resigned air of an innocent victim. Her habits were unwomanly, and often offensive. The more sensible of the other patients amongst whom she was, used to get very angry with her, because they thought that she could behave better if she would. "One can bear with Miss ——, because, poor girl, she does not know what she does, and cannot help it; but Miss —— knows quite well what she is about, and I am quite sure she can help it if she likes," was the style of complaint made against her. And there could be no doubt that she did know perfectly well what she was about, but her unconscious vicious nature, ever prompting, surprised and overpowered conscious reflection, which was only occasional.

Miss —— æt., forty, was respectably connected, and was herself possessed of sufficient property to enable her to live independently. She had a sister confined in an asylum. For a long time she had been utterly given over to intemperance, and lost to all sense of propriety; she was abandoned to sexual indulgence, and cared not with whom, and more than once had been sent to prison for her irregularities. Her natural feelings and affections were entirely perverted, and she wrote angrily and abusively to her brother, who had at last been compelled to take steps to have her taken care of, telling him that she was under the protection of an officer, and that she would let him know that she was a gentleman's prostitute. Of truth she seemed quite unable to form a conception, while lies, mischief, and vice were congenial to her nature. When prevented from indulging her vicious propensities, she would lie all day on the sofa, asserting that she was too ill to do anything, even to take a walk, and insisting that she ought to have every sort of delicacy. In her moods of excitement, she would sometimes talk of people plotting against her, and of herself being guided by the ruling planets; but there was no positive intellectual disorder detectable, though there was a painful state of extreme and hopeless moral alienation.

It is quite certain that these three women, so lost to all sense of the obligations of their position, could not restrain their immoral extravagances and perverse acts for any length of time; punishment had no effect, except in so far as it was a restraint for the time being. All of them knew quite well the difference between right and wrong, but no motive could be excited in their minds to induce them to pursue the right and eschew the wrong; their conduct revealed the tyranny of an unhappy organization; the world's wrong was their right. The ruling planets by which one of them, in her angry moods, professed to be guided was not, therefore, an absolute fiction, for therein was expressed the fate made for her by a vicious organization. For a like reason such patients feel no shame, regret, nor remorse for their conduct, however flagrantly unbecoming and immoral it may have been, never think that they are to blame, and consider themselves ill-treated by their relatives when they are interfered with. They are examples illustrating the retrograde metamorphosis of mind. The moral feeling has been slowly acquired in the course of human cultivation through generations as the highest effort of mental evolution; and in the course of family degeneration, we find its loss mark a stage in the downward course. The victims of such vice or defect of nature cannot be fitted for social intercourse. Friends may remonstrate, entreat, and blame, and punishment may be allowed to take its due course, but in the end both friends and all who know them recognise the hopelessness of improvement, and acknowledge that they must be sent to an asylum.

It is where hereditary taint exists that we meet with the most striking examples of this kind of insanity, and those which often cause such great difficulties in medico-legal investigations. There is the strongest aversion on the part of the public to admit that an extreme hereditary taint may be a not less certain cause of defect or disease of mind than an actual injury of the head; and yet it is the fact. The hereditary predisposition to insanity signifies some unknown defect of nervous element, an innate disposition to irregularities in the social relations; the acquired infirmity of the parent has become the natural infirmity of the offspring, as the acquired habit of the parent animal observably becomes sometimes the instinct of the offspring. Hence comes the impulsive or instinctive character of the phenomena of hereditary insanity, the actions being frequently sudden, unaccountable, and seemingly quite motiveless. Appeal calmly to his consciousness, and the individual may sometimes reason with great intelligence, and seem nowise deranged; leave him to his own devices, or place him under conditions of excitement, and his unconscious life appears to get the mastery, and to drive him to immoral, extravagant, and dangerous acts. He perpetrates some singular act of eccentricity because all the world will censure it, or even commits a murder for the sole purpose of being hanged. It is worse than useless for a sound mind to attempt to fathom the mad motives which spring up in a madman's mind; it is most unjust to judge his actions by a standard based upon the results of an examination of sane self-consciousness: to do so is simply to attempt to make coherency and incoherency, order and disorder, equivalent. Only long experience and careful study of actual cases of mental disease will suffice to give any sort of adequate notion of what a madman really is.

When there is no hereditary taint detectable in a case of so-called moral insanity, it is necessary to traverse the whole physical and mental life of the patient, by a careful research into his previous history, and scrupulous examination of his present state. It will be of great moment to ascertain whether there has been any previous attack of insanity; for it sometimes happens that after one or two attacks of melancholia with suicidal tendency, from which recovery has taken place, the patient gets an attack of genuine moral insanity, which may finally pass into intellectual disorder and dementia. The extremest example of moral insanity which I have seen was in an old man aged sixty-nine, who had been in one asylum or another for the last fifteen years of his life. He had great intellectual power, could compose well, write tolerable poetry with much fluency, and was an excellent keeper of accounts. There was no delusion of any kind, and yet he was the most hopeless and trying of mortals to deal with. Morally he was utterly depraved; he would steal and hide whatever he could, and several times made his escape from the asylum with marvellous ingenuity. He then pawned what he had stolen, begged, and lied with such plausibility that he deceived many people, until he finally got into the hands of the police, or was discovered, in a most wretched state, in the company of the lowest mortals in the lowest part of the town. In the earlier part of his insane career, which began when he was forty-eight years old, he was several times in prison for stealing. In the asylum he was a most troublesome patient. He could make excellent suggestions, and write out admirable rules for its management, and was very acute in detecting any negligence or abuse on the part of the attendants, when they displeased him; but he was always on the watch himself to evade the regulations of the house, and when detected, he was most abusive, foul, and blasphemous in his language. He was something of an artist, and delighted to draw abominable pictures of naked men and women, and to exhibit them to those patients who were addicted to self-abuse. He could not be trusted with female patients, for he would attempt to take indecent liberties with the most demented creature. In short, he had no moral sense whatever, while all the fault that could be found with his very acute intellect was, that it was entirely engaged in the service of his depravity. It may, no doubt, be thought that he was a desperately wicked criminal, and that his proper place was the prison. But the prison had been tried many times, and tried unsuccessfully. And there was another reason why prison-discipline could not rightly be permitted to supersede asylum treatment. At long intervals, sometimes of two years, this patient became profoundly melancholic for two or three months, refused to take food, and was as plainly insane as any patient in the asylum. It was in an attack of this sort also that his disease first commenced.

In other cases of moral alienation there will be found to have been more or less congenital moral defect, with maniacal exacerbations of positive moral insanity occurring perhaps at puberty, perhaps at the menstrual periods, perhaps after severe disappointment. Again, moral insanity may occur after acute fevers, after injury to the head, after some form of brain disease; in some instances it is the first stage of mental degeneration consequent on self-abuse; now and then it occurs in consequence of a severe moral shock as the forerunner of more marked insanity; and it not unfrequently precedes general paralysis. But the disease with which it is most commonly found in conjunction is epilepsy: a so-called masked epilepsy sometimes appears in attacks of positive moral insanity of variable duration and of periodical recurrence, the attacks perhaps coming on regularly for months, before the characteristic convulsions make their appearance ; or extreme moral perversion may immediately precede epilepsy; or again, the epileptic convulsions may cease, and attacks of moral insanity, with more or less maniacal excitement, take their place. There can be no question in the minds of those who have studied mental diseases, that certain unaccountable criminals belong to the class of epileptics.*

Thus much concerning this second variety of affective insanity —*Moral Insanity Proper.* Whatever name it may ultimately be thought best to give it, there can be no doubt of the necessity of recognising in practice the existence of such a form of disease. If, indeed, the evidence drawn from its own nature and causation were insufficient, the fact that it is often the immediate forerunner of the severest mental disease might suffice to teach its true pathological interpretation. When, therefore, a person in good social position, possessed of the feelings that belong to a certain social state, and hitherto without reproach in all the relations of life, does, after a cause known by experience to be capable of producing every kind of insanity, suddenly undergo a great change of character, lose all good feelings, and from being truthful, temperate, and considerate, become a shameless liar, shamelessly vicious, and brutally wicked, then it will certainly be not an act of charity, but an act of justice, to suspect the effects of disease. At any rate it behoves us not to be misled in our judgment by the manifest existence in such a patient of a full knowledge of the nature of his acts—of a consciousness, in fact, of right and wrong; but to remember that disease may weaken or abolish the power of volition, without affecting consciousness. Fortified by this just principle, we shall be far better prepared for a right interpretation of the facts of a particular case than when biassed or blinded by the opposite most false principle.

3. *Ideational Insanity.*—Under this general name may be included those different varieties of insanity usually described as

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* Morel, D'une Forme de Délire suite d'une Surexcitation nerveuse se rattachant à une Variété non encore décrit d'Épilepsie. 1860. J. Falret, De l'État Mentale d'Épileptiques.

Mania or *Melancholia*: the unsoundness affects *ideation*, and is exhibited in delusions and intellectual alienation. Cases of ideational insanity are easily recognised to be of two principal kinds, according to the character of the accompanying feeling: in one kind there is great oppression of the self-feeling with corresponding gloomy morbid idea; in the other there is excitement or exaltation of the self-feeling, with corresponding lively expression of it in the character of the thoughts or in the conduct of the patient. The former cases belong to *Melancholia;* the latter to *Mania*, acute or chronic. Again, on looking at cases of ideational insanity, it is easily seen that there is general intellectual derangement in some, while in others the alienation seems to be confined to a small number of fixed ideas; so that we might make a division of ideational insanity into (*a*) general and (*b*) partial. If we did so, then partial ideational insanity would really correspond with what Esquirol called *Monomania*, though not with what is now usually called so; for under that name was included by him not only partial mania accompanied by an exciting or gay passion, but also partial intellectual insanity accompanied by a sad and oppressive passion; the latter he subdistinguished as *Lypemania*, but it is now commonly separated as *Melancholia*. Whether this is wisely done may admit of considerable doubt: there are met with in practice as many varieties of emotional perversion as there are varieties of morbid ideas, different patients exhibiting every degree and kind of passion, from the rapture of the exalted monomaniac to the deep gloom of the profound melancholic; and accordingly it is not always possible, under the present nomenclature, to determine satisfactorily whether a particular case belongs to monomania or to melancholia. Certain cases of melancholia do in point of fact furnish the best examples of monomania. Another reason against the present classification is that there are cases of acute melancholia in which the excitement and the derangement of ideas and conduct are so great that they run insensibly into acute mania, and might just as properly be called so: they are examples of acute ideational insanity, but whether they are classified as maniacal or melancholic is very much a matter of caprice or accident.

A third objection to an adherence to the present artificial classification is, that it has unquestionably fettered observation, and hindered the faithful study of the natural history of insanity. The different forms of affective insanity have not been properly recognised and exactly studied because they did not fall under the time-honoured divisions; and the real manner of commencement of intellectual insanity in a disturbance of the affective life has frequently been overlooked. It is true that Guislain and Griesinger have held that a melancholic stage of depression almost invariably precedes an outbreak of mania; and there can be no doubt that the sequence is traceable in very many cases. But it cannot be admitted, as some would have it, in every case. What has been overlooked even by those who have not overlooked the preliminary affective derangement is, that there is not only (*a*) a *melancholic perversion* of the affective life preceding intellectual derangement, but that there is also (*b*) a *maniacal perversion* of the affective life, so to speak,—an affective insanity which is of an excited or expansive kind, in which the individual's self-feeling is greatly exaggerated or morbidly exalted. It is a maniacal disorder of the feelings, sentiments, and acts, without delirium, and it is expressed chiefly, as the corresponding affective melancholia is, not in delusion but in the conduct of the patient. Though frequently following a brief stage of melancholic depression, this condition is sometimes primary. It is displayed in a great change of moral character: the parsimonious becomes extravagant, the modest man presumptuous and exacting, the affectionate parent thoughtless and indifferent; there is great liveliness of manner, or a restless activity as of one half-intoxicated; an overweening self-esteem is very evident, and an extravagant expenditure of money, an excessive sexual indulgence, or other intemperance, is common. The tone of the mental nature is profoundly deranged; the foundations of the mental being are shattered; and the patient is often practically less fitted for his relations in life than at a subsequent stage of the disease, when matters have gone further and the morbid action is systematized in some definite delusions. In some cases there may be less *exaltation* manifest, while the *perversion* of the affective life is more marked,—in other words, the *moral alienation* more extreme; this condition being perhaps best witnessed in that profound moral derangement which sometimes precedes a series of epileptic fits, or takes the place of an epileptic fit.

So soon as we have recognised the existence of a deep perversion of the feelings, sentiments, and acts, having a brisk maniacal rather than a gloomy melancholic character, and preceding in some cases the outbreak of intellectual derangement, we fail not to perceive how closely it is allied to, or rather how it is fundamentally identical with, those stages of insane degeneration already described as varieties of affective insanity. In fact, the *Mania sine delirio* of Pinel, the *Monomanie raisonnante ou sans délire* of Esquirol, the *Monomanie affective* of the same author, and the *Moral Insanity* of Prichard,—all are varying phases of this affective disorder, which, continued, usually ends in positive intellectual disorder or dementia. Though an earlier stage of mental degeneration than intellectual insanity, it is really, from a social point of view, a more dangerous form of mental disease; for its natural tendency is to express itself, not in words, as ideational insanity does, but in actions. It is a condition in which dangerous hallucinations and dangerous impulses are both apt to arise suddenly and to hurry the patient into some desperate act. Once more then let it be repeated, that man is not only a consciously active being, but also an unconsciously active being; and that, although the unconscious mental function is, in the state of perfect bodily health, subordinated to the directing power of the will, yet, when disease has disturbed the harmony of parts, the unconscious activity displays its effects independently of the will or even of consciousness.

For the foregoing reasons I hold that it would conduce to greater precision of knowledge, and would be followed by some valuable practical results, if the present artificial classification, which is not really in conformity with nature, and which assumes an entirely fictitious exactness, were considerably modified. If a broad division were made of insanity into two classes, namely, insanity without positive delusion and insanity with delusion, in other words, into *affective* insanity and *ideational* insanity; and if the subdivisions of these into varieties were subsequently made—would not the classification, general as it may appear, and provisional as it should be deemed, be really more scientific than one which, by postulating an exactness that does not exist, is a positive hindrance to an advance in knowledge? One desirable result of great practical consequence could not fail to follow; that is, the adequate recognition of those serious forms of mental degeneration in which there are no delusions. I have ventured accordingly in a former publication to put forward the following classification:*—

I. AFFECTIVE OR PATHETIC INSANITY.

1. MANIACAL PERVERSION OF THE AFFECTIVE LIFE. MANIA SINE DELIRIO.
2. MELANCHOLIC DEPRESSION WITHOUT DELUSION. SIMPLE MELANCHOLIA.
3. MORAL ALIENATION PROPER. Approaching this, but not reaching the degree of positive insanity, is the INSANE TEMPERAMENT.

II. IDEATIONAL INSANITY.

1. GENERAL.
    a. Mania. } Acute and
    b. Melancholia. } Chronic.
2. PARTIAL.
    a. Monomania.
    b. Melancholia.
3. DEMENTIA, primary and secondary.
4. GENERAL PARALYSIS.
5. IDIOCY, including IMBECILITY.

The cases of so-called *impulsive* insanity, which for practical purposes has just been illustrated separately as a variety of affective insanity, will really fall under one or other of its above-mentioned varieties: in all of them dangerous impulses are apt to arise, and to express themselves in convulsive action; and, where a desperate impulse displays itself without any apparent affective disorder, it is only that the outward violence masks the internal derangement.

Whatever classification be adopted in the present state of our knowledge of so obscure a subject, it must be provisional. What meanwhile it is most important to bear in mind is, that the different forms of insanity are not actual pathological entities, but different degrees or kinds of the degeneration of the mental organization,—in other words, of deviation from healthy mental life; they are consequently sometimes found intermixed, replacing one another, or succeeding one another, in the same person. There is in the human mind a sufficiently strong propensity not only to make divisions in knowledge where there are none in nature, and then to impose the divisions upon nature, making the reality thus conformable to the idea, but to go further, and to convert the generalizations made from observation into positive entities, permitting for the future these artificial creations to tyrannise over the understanding. A typical example of madness might be described as one in which the disorder, commencing in emotional disturbance and eccentricities of action—in derangement of the affective life, passes thence into melancholia or mania, and finally, by a further declension, into dementia. This is the natural course also of mental degeneration when proceeding unchecked through generations. Although then we may have the different stages passed through within the brief space of a single life, this is not a sufficient reason why they should not be distinguished and separately treated of; for not only may a person suffer from one kind of mental derangement without ever falling victim to another, but the different varieties run their particular course, call for their special prognosis, and require their special treatment.

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* Article "Insanity," in Reynolds's System of Medicine, vol. ii.

(*a*) *Partial Ideational Insanity.*—This division will correspond with that originally described as monomania by Esquirol, and will include not only delusion accompanied by an exalted passion, but also delusion accompanied by a sad and oppressive passion—monomania proper and ordinary melancholia. In the former an exalted self-feeling gets embodied in a fixed delusion, or in a group of delusions, which fails not to testify an overweening self-esteem; it is clothed in a corresponding delusion of power or grandeur, and the personality of the patient, who may fancy himself king, prophet, or divine, is transformed accordingly: in the latter, the feeling of oppression of self becomes condensed into a painful delusion of being overpowered by some external agency, demonic or human, or of salvation lost through individual sins. In both cases we have a partial ideational insanity—in the one case with overweening esteem of self, in the other with oppression of self—with fixed delusion or delusions upon one subject or a few subjects, apart from which the patient reasons tolerably correctly. Pathologically, there is a systematization of the morbid action in the supreme cerebral centres, the establishment of a definite type of morbid nutrition in them.

A morbid idea, or a delusion, engendered in the mind and persisting there, may be compared with a morbid growth in some organ of the body, or with a chronic morbid action, which cannot be brought under the correcting influence of the surrounding healthy tissues, and restored to a sound type. Similarly, the morbid idea does not, as in health, call up other ideas which may supersede it, its energy being transferred, and itself becoming latent or statical under the unconscious assimilating influence of the cerebral centres, so that the present is brought into accord with the past, or with that mental organization which by an abstraction we call the *ego ;* but the morbid idea is not assimilable, cannot be made of the same kind with the sound elements of the mental organization, is in entire contradiction with the past, and remains unaffected by reflection, because it cannot really enter into any reflection: like a cancer, or any other strange morbid growth, it continues its own morbid life, and the whole conscious life may at any moment be brought under its dominating influence: it represents a partial automatic morbid action, like a spasm beyond the control of volition, though, like a spasm, not always beyond the knowledge of consciousness. A young man, for example, who had previously had a few epileptic fits, became extremely melancholic, being possessed with the morbid idea that he was to be murdered in his father's house; he made frequent attempts to escape from it, and the precautions taken to prevent his escape only served to strengthen his delusion.* Reasoning with him was of no use, for the notion was not explicable on any reasonable principles: if a looker-on could truly enter into the steps of the mental processes by which such a delusion was generated, he would be as mad as the patient; and if the patient could appreciate the force of the reasoning by which the looker-on proves the notion to be madness, why then he would not be mad at all. It is the patient's disease that he cannot: when the constitution of his nervous element is such that an absurd delusion of that kind could persist and not be corrected by the stored-up results of past mental acquisitions—whether such as might be consciously recalled, or such as existed as statical faculties interworking in unconscious assimilating action—then it is the sure testimony of fundamental damage to the mechanism of mental action, the consequences of which are a disorder and incoherence of action inconsistent with, and therefore unintelligible to, the experience of the sound mind. The very fact that such a notion is not self-annihilating is evidence of a fundamental disorder, which, if it should not actually prepare us to look for, at any rate should make us receive without surprise, any further irrational exhibition by the patient. Hence also it is that if we admit the false premisses of the madman's delusion, he cannot follow us in rational deductions from them; he does not generally, as Locke supposed, reason correctly from false premisses; he is not logically mad; but his whole manner of action is more or less incoherent, and betrays the disease of which the delusion is a symptom. In vain do men pretend that the mind of the monomaniac is sound, apart from his delusion: not only is the diseased idea a part of the mind, and the mind, therefore, no more sound than the body is sound when a man has a serious disease of some vital organ, but the exquisitely delicate and complex mechanism of mental action is radically deranged: the morbid idea could not else have been engendered and persist. The mind is not unsound upon one point, but an unsound mind expresses itself in a particular morbid action. Moreover, when the delusion is once produced, there is no power of drawing a sanitary cordon round it, and thus, by putting it in quarantine as it were, preserving all other mental processes from infection: on the contrary, the morbid centre reacts injuriously on the neighbouring centres, and there is no guarantee that at any moment the most desperate consequences may not ensue. That was precisely what did happen in the case which we have taken for illustration: the young man, whose father was a butcher, becoming calmer after a time, and being thought trustworthy, was permitted at his own request to be present at the slaughter of an ox; but, when all was finished, he did not wish to return home. His friends, however, pressed him, and two of them, taking him by the arm in a friendly manner, accompanied him towards his home; but, just as he approached the door of his house, he suddenly drew out a butcher's knife which he had concealed, and stabbed to the heart one of them, fleeing immediately to the forest, where he passed the night. Next morning he went to the house of a relative who lived some distance off, and said that he had run away from home, as they wished to kill him there. In this case the homicidal act had a discoverable relation to the delusion, although a very insane one; but in some cases of monomaniacal delusion there is no relation whatever discoverable between the delusion and the act of violence, while in others the patient may subsequently make known a most absurd and incoherent connexion which the most sagacious looker-on would never have suspected, and cannot understand.

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* Cazauvieh, De la Monomanie Homicide. 1836.

The signification of a persistent delusion in the mind, in regard to those intimate organic processes on which rests the integrity of mental action, is threefold: first, the fact of the delusion betokens a fundamental disorder in the organic processes as the condition of its existence, the extent of such disorder being nowise necessarily limited to its production; secondly, the existence of a centre of morbid action in the midst of numerous most sensitive nervous centres, which are connected in the most delicate, intimate, and complex manner, will tend to produce by sympathy, infection, or induction, or reflex action, call it as we may, some derangement in them; and, thirdly, the automatic activity of the morbid centre, reaching a certain intensity, may become an uncontrollable impulse, and, irresistibly uttering itself, hurry the patient into some insane action instigated by it. In other words, psychologically speaking, the existence of a delusion indicates fundamental disorder of mental action—radical insanity; secondly, the delusion reacts injuriously upon other mental phenomena, interfering secondarily with correct ratiocination, or due co-ordination of function, and predisposing to convulsive mental phenomena; and, thirdly, while it cannot be subordinated to reflection, the individual may at any moment be subordinated to it, and act under its instigation. The mind then which suffers from positive ideational insanity, however seemingly partial, is, being unsound, not to be relied upon, nor to be held responsible; disease is going on in it, and it does not depend upon the individual wishes or will what course it shall take or what height it shall reach, any more than the health of a man bodily sick depends upon the desire which he may have to rise, take up his bed, and walk.

Certainly, in some cases of so-called monomania or partial ideational insanity, there does appear to be but little evidence of insanity apart from the particular morbid ideas; but such cases are generally met with in an asylum, where the patient is removed from those particular relations in which the moral perversion might be expected to display itself, and where the quiet regularity of life and the absence of all exciting impressions favour the latency of the affective insanity. Allow those patients who are so calm and serviceable in the asylum, to return to active life, and to be subjected to the strain of trying circumstances, or the stress of adverse events, and they soon suffer from attacks of general excitement, if they do not perpetrate acts of dangerous violence; even in the asylum they have now and then their bad times, in which they are morose, uncertain, and excitable. Nothing is more surprising to the inexperienced person than the extreme passionate excitement and utter irrationality, when they do break out, of these monomaniacs, whom he has hitherto regarded as quite sensible apart from their delusion, and as harmlessly interesting perhaps by reason of it. They will mostly tolerate with great composure the annoyances of their fellow-patients, because they look down upon them with pity as mad; but once let them be offended and excited, it is rendered very plain how unstable and dangerous is their state of mind.

It is necessary to guard against the mistake of supposing the delusion to be the cause of the passion, whether painful or gay, that may accompany partial ideational insanity. In cases of simple melancholia there may be no delusion: the patient's feeling of external objects and events may be perverted so that he is conscious of being strangely and unnaturally changed; impressions which should be agreeable or indifferent are painful; he feels himself strangely isolated, and cannot take any interest in his affairs; he is profoundly miserable and shuns society, perhaps lying in bed all day. All this while he may be quite conscious of his unnatural state, and may strive to conceal it from his friends. Suddenly, it may be, an idea springs up in his mind that he is lost for ever, or that he must commit suicide, or that he has committed murder and is about to be hanged; the vast and formless feeling of profound misery has taken form as a concrete idea—in other words, has become condensed into a definite delusion, this now being the expression of it. The delusion is not the cause of the feeling of misery, but is engendered of it,—is precipitated, as it were, in a mind saturated with the feeling of inexpressible woe; and it takes different forms according to the degree of the patient's culture, and the social, political, and religious ideas prevailing at the particular epoch. In some cases it is striking how disproportionate the delusion is to the extreme mental anguish, the patient assigning the most ridiculously inadequate cause for his gloom : one man under my care, whose suffering was very great, said that it was because he had drunk a glass of beer which he ought not to have done, and another man was, as he thought, lost for ever because he had muttered a curse when he ought to have uttered a prayer. With him who believes that he is doomed to infinite and eternal misery, it is not the delusion but the affective disorder that is the fundamental fact; there cannot be an adequate or definite idea in the finite mind of the infinite or the eternal; and the insane delusion of eternal damnation is but the vague and futile attempt to express an unutterable real suffering. In all these cases of melancholia the deep sense of individual restriction which exists, the wretched feeling of the oppression of self, is interpreted as due to some external agency; and as the existence of any passion notably intensifies an idea that is congruous with it, the delusion ultimately attains great vividness. So with regard to other passions, whether excited by some external event or some internal commotion; when vehement and long continued, they are apt to end in some positive delusion. The vain person who cherishes an ambitious passion may after a time be so entirely possessed by it that he is unable to see things as they really are, and his overweening self-esteem terminates perhaps in the delusion that he is emperor, king, or even divine. The essential nature of the delusion will depend upon the special nature of the passion in which the individual's self-feeling is engaged, but the particular form which it assumes will depend greatly upon the education and upon the circumstances of life in which he has been placed. Thus the vain and ambitious person who has had a religious training will assume a character in accordance with his sentiments, and will deem himself a prophet favoured of heaven, or even Jesus Christ; the politician will be a prime minister, or some great political character; the man of science will have solved the problem of perpetual motion, or will be the victim of complicated and ingenious persecution by means of electricity. When witchcraft was generally believed in, the insane frequently fancied themselves to be tormented by witches; but since the police have been established, they often believe the police to be in pursuit of them. At the time when Napoleon was setting up and pulling down kings, many people were admitted into French asylums who believed themselves to be kings and emperors; and Esquirol thought that he could have written the history of the French Revolution from the character of the insanity which accompanied its different phases. The insanity of any time will be a more or less broken reflection of the character of the events that happen in it.

The following briefly reported cases may serve as illustrations of partial ideational insanity, and of the foregoing observations:—

C. K., æt. 36, married, had always been of an extremely religious character and of exemplary behaviour. After he had been married for about a year, his present illness began with general depression of feeling and with the involuntary appearance in his mind of blasphemous ideas in spite of all his efforts to avoid them; he was greatly afflicted by this state of things, his gloom increased, and at last he concluded that "he had done it," —namely, committed the unpardonable sin. Here we perceive, first, a morbid affection of nerve element revealed in the emotional depression, then an automatic and spasmodic activity of certain ideational cells manifest in the involuntary and irrepressible ideas that arose, and finally the concentration or systematization of the morbid action into a definite delusion. The patient was further very hypochondriacal, and fearful that he should die soon; but, although his heart's action was very feeble, and his pulse remarkably slow, there was no evidence of organic disease; and it appeared that the feebleness of cardiac action was due to the depressing effects of the morbid idea upon the organic functions, all which shared more or less in the prostration. His reasoning powers were, however, nowise affected apart from his delusions; he was fully alive to all business relations, and would converse intelligently and even cheerfully on indifferent matters. But the moment his attention was no longer diverted from his own suffering, and otherwise engaged, the morbid idea returned in all its force, entirely occupied consciousness, his countenance became overcast, and he—just now so cheerful—presented the characteristic dejected appearance of profound melancholy. He lived, as it were, two separate lives—as a sound, reasonable being, and as a morbid automatic being; he was quite aware of his affliction, and could reason about it as a man might reason about a peculiarity of his character or a particular conformation of his body, though he could not be persuaded of its true nature; but, so soon as the train of mental activity excited by external events was past, the morbid idea became consciousness. He was made so miserable by it that he more than once attempted suicide. Herein we have an example of what is sometimes called the correct reasoning of the monomaniac from false premisses; believing that he has committed the unpardonable sin and that his soul is for ever lost, he does that which may soonest precipitate the result which he so much dreads. An uncle had been similarly afflicted, and had died insane.

Intelligently as this patient could talk, and rational as he appeared, apart from his delusion, it would not be correct to pronounce him perfectly sensible under such limitation. There was no sufficient reason in his intellectual disorder why he should not have continued his business, but he could not do so; he could not take interest in that, in his family, or in anything else but himself; every impression was more or less painful to him, his whole manner of feeling being perverted, and he sought therefore to avoid society and to be alone. At times, too, his anguish increased to a veritable acute paroxysm, and then he looked very helpless and insane. Now the case which follows, very similar to the foregoing in general symptoms, illustrates, by an important additional symptom, a dangerous feature in some of these cases.

J. B., æt. 51, married, had made a small fortune by his own energies, and had brought up a family respectably. He was a stout, hard-faced, big-browed man, of surly appearance and melancholic temperament. Of the Wesleyan persuasion, he had always been very attentive to his religious duties; indeed, religious devotion was said to be the cause of his illness, which certainly began with doubts as to his religious state. He became gloomy, morose, and depressed, and took to his bed five weeks previous to his being sent to an asylum. He would not get up, however much entreated: why should he? He was dying, and there was no salvation for him, for his soul was lost. He slept fairly and ate well, though he professed at times that he could not eat. In the asylum he was listless, gloomy, and exceedingly averse to exertion of any kind, always maintaining that he was dying. "It's of no use, I tell you, doctor, asking me how I am: you know I'm dying." Apart from the delusions as to his soul and his body, he was intellectually rational, although his affective life was much perverted. After a month's residence, there was some improvement in his state; he walked outside the grounds after having been almost forced to go once or twice; he was more cheerful too, and would talk a little. It was thought that he was going on very favourably. One night, however, without any warning, he suddenly started out of his bed, rushed at a window, through which it would have been thought impossible that a man of his size, or indeed of any usual size, could have got, struggled through it, and fell from a height of twenty feet, fortunately on his feet, so that he was only grievously shaken. He was, however, in a state of fearful excitement, fancying that the world had come to an end, writhing, and crying frantically, "Let me go, let me go!" Like sudden desperate paroxysms seized him periodically for the next three weeks; after which he began to improve. He became talkative, cheerful, and interested in his family, though maintaining for a time, for the sake of consistency seemingly, that he was no better, and only employing himself when he thought that no one was observing him. In three months more he was discharged quite recovered.

In these cases, when the melancholic anguish has reached a certain intensity, it appears to be a matter of accident whether the convulsive explosion is expressed in some act of violence directed against the patient's own life or against the life of another, although it may be expected that, if the delusion is one of persecution from others, the violence will be displayed against the supposed enemies.

The following case further illustrates the acute attacks of paroxysmal anguish that supervene in the course of chronic melancholia or ideational insanity with depressed passion:—

Miss F., æt. forty-one, appeared to be as strong-minded and good-natured a lady as could be met with. Her manner was abrupt and decidedly energetic, and she is described as having always been a little queer. The melancholy for which she was finally sent to an asylum was said to have come on seven months before, in consequence of a supposed offer of marriage which she thought she had refused—in reality, none such was ever made. She now believed that she was lost for ever in consequence of this refusal; she wrung her hands in her extreme distress, and, with a face tense with anguish, exclaimed that "she had done it;" "that she was so near Zion's gate." But her mental state varied much, and varied suddenly. One day she would be in the greatest mental agony, rolling on the floor, writhing and twisting herself into the strangest forms, as though in her anguish she would tie her body into knots: on another day her delusion seemed to have retired into the background, and she was calm, natural, conversed most sensibly, and employed herself industriously. No one who saw her only in those calmer periods could conceive how unspeakably insane she was in her acute paroxysms. In her calmer moods, when not engaged in any occupation or conversation, and when apparently unnoticed, she might be observed to wring her hands, and to repeat in an undertone, "Good God!" When her attention was called, on these occasions, to what she was saying and doing, she was often quite unconscious of it. And that might teach us that the morbid manifestations were of an automatic or reflex character, and that it is possible for such morbid phenomena, under certain bodily conditions, to attain a convulsive character, without consciousness of them at the time, and without memory of them afterwards. The psychologist would be a bold, as he certainly would be an ignorant and mistaken man, who should assert that the frenzy might have been controlled because there was usually a persistence of reason. It were as just to assert that the reflex convulsive action of a spinal cord poisoned by strychnia must be controllable, because the ordinary reflex acts of a healthy cord are so.

It is noteworthy, in some of these cases, how sudden and complete may be the change from the deepest anguish and despair to a state of perfect calm and sanity. Thus one of my patients, who suffered from acute melancholy, who usually wandered about moaning grievously, or sat weeping profusely, and who had made several attempts against her own life, awoke one morning seemingly quite well, rational, cheerful, and wonderfully pleased at her recovery, remaining so for the rest of that day. Next morning, however, she had entirely relapsed, and it was some months before she finally recovered. Again Griesinger mentions the case of a woman with melancholia and delusions as to loss of property and persecution, who for the space of a quarter of an hour was quite herself, and then relapsed. Such cases are of interest in regard to the pathology of the disease, as they would seem to prove that there is no serious organic disease so far—that the condition of nerve-element is a polar modification which may soon pass away, not unlike, perhaps, the electrotonic state that may be artificially produced in nerve.

Miss S., æt. twenty-two was rather a good-looking young lady, though with an irregularly formed head, and a deformity of one ear, and with a strangely wandering and occasionally vacant look. Her family is saturated with insanity, and the present is said to be her third attack. She is surcharged with grief, moaning continually, and weeping so abundantly as to surprise one how she can raise so many tears. She exclaims that she is utterly estranged from God, and sobs as though her little heart must break. Notwithstanding this extreme exhibition of mental suffering, one could not, on carefully observing her, but conclude that she was not really so miserable as she looked, that her distressing actions were in great part automatic. And there was truth in the instinctive suspicion; for in the midst of the most violent sobbing, she would sometimes, on the occasion of a ludicrous or sarcastic observation, look up quite calmly, speak quietly, and even smile for a moment, and thereupon relapse instantly into her extreme grief. She was quite conscious of her state, and threw all the blame of it upon her friends, who, she said, ought to have subjected her to proper restraint and discipline, instead of indulging her in every way, as they had done. Previously to being sent from home she had been very wilful and impulsive, sometimes starting out of the house, and saying that she must kill herself. After being in the asylum for a few days she became calm and composed, spoke quite rationally, and professed herself very well contented with her position, and with the course which her friends had taken on her behalf. And yet, while wearing this cheerful and contented manner, she was secretly posting letters to her friends, full of the bitterest complaints, moanings, and reproaches, sentence after sentence in them beginning, "Oh God!" Reminded of her inconsistency, she sank into the deepest self-accusation and abasement, said she was utterly wretched on account of her deceitfulness and wickedness, which she could not help, and that she was lost for ever. And, indeed, she could not help it. She was sincerely cheerful in her new relations when engaged in conversation, or in some occupation, but when she sat down to write home the old feelings returned, and the old automatic morbid activity broke out. Ultimately she recovered, the morbid tension gradually subsiding, and finally disappearing in the entirely changed relations. This example enables us to understand, in some sort, how it is that murderers in an asylum sometimes appear to be unconscious of what they have done, and, if they are conscious of their crime, never think they are to blame; for the automatic activity of their morbid nature has surprised them, and when they reflect upon the act of violence, if they do so, it is as upon an act done by some one else.

The foregoing cases will suffice to illustrate partial ideational insanity, although they all fall under that division of it usually called melancholia. In conversing with patients so afflicted, it is impossible to avoid being surprised at the strange discord or incoherency which their mental character exhibits: they are often, as it were, double beings—a rational and an insane being: the two beings cannot be brought into intercommunication and beneficial reaction upon one another, for the persistence of the delusion implies the cutting off of such interaction; as conscious manifestations they are independent, isolated. One day the sound being is in predominant or exclusive action; another day, the unsound being: on different occasions one might say —"Now I am talking with the rational being; now with the morbid being." Herein we have the explanation of the doubt which such patients sometimes have of themselves; they are not confident at times, and appear only to half believe in their delusion, because they are not then under its entire influence: their rational nature is in predominant action, and they act in their relations as if their delusion really was a delusion. It would be a mistake, however, to put any reliance on such seeming hesitation: let the delusion be excited into activity, all doubts vanish, and the sound being is brought into dangerous bondage to the unsound being.

In a complete account of partial ideational insanity, whether accompanied by a gloomy or a gay passion, the effects of the delusion should be considered—as was done when considering idea physiologically—first, upon sensation; secondly, upon the processes of nutrition and secretion; and, thirdly, upon the movements or general conduct of the patient. As the delusion is sometimes the final effect of a morbid organic stimulus resulting from bodily disease, so it in turn, however caused, reacts injuriously on the bodily nutrition and on sensibility. The latter is commonly much affected in melancholia. There may be general or partial diminution or perversion of the sensibility of the skin, or a local complete loss thereof; and complaints of precordial anguish and of strange epigastric or abdominal sensations testify to the perversion of organic sensibility. These complaints, causeless as they may seem, are not always without significance. Illusions and hallucinations of the special senses are frequent: one patient, believing himself lost, sees the devil in his room, another smells a corpse in his room, a third tastes poison in his food, a fourth hears voices which revile and accuse him, or which suggest impious thoughts and instigate violent deeds—it may be to imitate Abraham and sacrifice his child.

The general depression of tone in melancholia is felt throughout the processes of nutrition, although not usually in observable proportion to the great apparent suffering. So vast indeed does this seem in some cases that the wonder is that organic life can go quietly on. However, digestion mostly fails, and constipation becomes troublesome; the skin loses its freshness, and gets sallow, dry, and harsh; the temperature of the body is lowered, and the extremities are cold; the pulse is feeble, sometimes very slow, and even intermittent; the respiration is slow, moaning, and interrupted by frequent and long-drawn sighs; the urine is in some cases abundant in quantity and very pale in colour; the menstruation is generally irregular or suppressed. Everything indicates the depressing influence of the gloomy morbid idea on the organic life. There is usually a great want of sleep, although patients are apt to assert that they have not slept when they really have, so little has been the feeling of refreshment therefrom. Refusal of food, which is common and sometimes very persistent, may be due to other causes besides the want of appetite and general sluggishness of nutrition: it may be in consequence of a fear of poison in the food, or of a delusion that the intestines are sealed up, or in order to die by starvation, or in fancied obedience to a voice from heaven.

There is the same depressing influence exerted upon the voluntary movements; these, like the ideas, are sluggish generally, and the conduct of the patient accords with the character of his mental state. In an extreme form of melancholia known as melancholia with stupor, *M. attonita*, where the mind is entirely possessed with some terrible delusion, the patient sits or stands like a statue, and must be moved from place to place; the muscles are generally lax, or some of them are fixed in a cataleptic rigidity; the patient, as if in a trance or as one only partially awake, scarcely seems to see or hear; consciousness of time, place, and persons is lost; and the bodily wants and necessities are alike unheeded. Between this condition at one end of the scale, and those cases at the other end in which there is an acute utterance of the internal agony in gesture-language, though this is usually of a somewhat uniform or even monotonous character, there are of course cases representing every sort of intermediate stage. But where there is the most activity of movement in melancholia it is confined to the expression of the mental suffering, or to the common attempt to escape from it by suicide: there is an extreme aversion for the most part to exercise, employment, and activity of a beneficial kind.

In monomania proper, where the delusion is attended with an exalted feeling, its effects upon sensibility, nutrition, and movement are different. There appears to be no real diminution of general sensibility, though the sensations are not always attended to, by reason of the excited mental state; but hallucinations of the special senses are by no means uncommon, and they appear both as occasional consequences and occasional causes of the delusion, which in any case they fail not to strengthen. There is not usually any notable interference with the processes of nutrition. The behaviour of the patient often expresses with sufficient distinctness the character of his delusion: one may reveal his exalted notions in his gait, manner, and address, while another is not satisfied with the capabilities of ordinary language to express the magnificence of his ideas, but invents new and mysterious signs which, unintelligible to every one else, have wonderful meaning for him. A third makes perhaps sweeping plans and projects, enters upon vast undertakings, and sometimes goes through an immense amount of patient and systematic work in perfecting some impossible scientific invention.

The courses which melancholia and monomania run respectively are different. In melancholia remissions are common, but complete intermissions rare. It is striking in some cases how suddenly a great change may take place: Griesinger, as already said, quotes one case in which there was a perfectly lucid interval for the space of a quarter of an hour; and I have more than once seen a melancholic go to bed cheerful and seemingly quite well, and yet awake in the morning as bad as ever. It is never safe to trust to these sudden conversions from gloom to cheerfulness. When recovery does really take place, as it does in half or even more than half of the cases of melancholia, it is usually gradual, and takes place within from four to twelve months from the commencement of the disease. After twelve months a favourable result, though less probable, is still not hopeless, for there are instances on record in which recovery has taken place after the disease has lasted years. Of the cases that do not recover, about half decline into mental weakness or complete dementia, the rest remaining chronic or ending in death. Though death may take place in consequence of refusal of food and exhaustion, it is often due to intercurrent disease, phthisical, cardiac, or abdominal, and most often to phthisis. It was in melancholics who had died after long refusal of food that Guislain most frequently met with gangrene of the lung. I have met with it in one such case.

The course of monomania, once established, is very seldom towards recovery. The reasons of this are not far to seek: in the first place, monomania is often secondary to mania or melancholia, and represents therefore a further degree of mental degeneration than these diseases; and in the second place, when it is primary, the fixed delusion is commonly the exaggeration of some fundamental vice of character, and has been slowly developed. Whether primary or secondary, the fixed delusion marks the establishment of a definite type of morbid action of a chronic nature, such as is not easily got rid of in any organ of the body, much less so in an organ so delicate as the brain. Nevertheless recovery does sometimes take place under the prolonged influence of systematic moral discipline, or after some great shock to, or change in, the system—whether emotional, or produced by some intercurrent disease, or occurring at the climacteric period. As a general rule it may be said that recovery does not take place when a fixed delusion has lasted for more than half a year. When it does not, the disease remains chronic, or passes into dementia: the more the exaggerated self-feeling which underlies and inspires the delusion wanes, and the more this, losing its inspiration, becomes a mere form of words, the nearer the case gets to incoherent dementia.

The reason why the prognosis is so much more favourable in partial ideational insanity with depression than in partial ideational insanity with exaltation, though sufficiently set forth already, might be roughly stated thus: that in the former the system is painfully sensible of its infirmity, depressed thereby, and feels the need of amendment, while in the latter it is abundantly satisfied with its condition, gay, and sensible of nothing to amend.

(*b*) *General Ideational Insanity.*—This division will include all those cases of intellectual alienation which are commonly described under *mania*, as well as many cases of general intellectual disorder in which, notwithstanding the excitement, the evidence of much mental suffering leads to their being placed under *melancholia*. In fact, it is not possible in practice to draw the line of distinction between acute mania and acute melancholia, which often blend, follow one another, or run into one another, in a way that defies exact division; for although we may properly say that there is in acute mania an excitement or exaltation of the self-feeling, the expression of which takes place chiefly in the actions of the patient, who sings, dances, declaims, runs about, pulls off his clothes, and in all ways acts most extravagantly, yet there may be equal excitement and restlessness of action in a patient who believes himself bewitched or lost, while another, exalted and furious one day, shall be frenzied with anguish next day. They all, however, agree in being examples of acute ideational insanity. In most cases, before the actual outbreak there is, as already set forth, a premonition of it—a precursory stage of depression, of shorter or longer duration, sometimes so brief as to escape notice; upon which follow increased excitability, sleeplessness, restlessness, extravagance of behaviour, rapid flow of ideas imperfectly or strangely associated or entirely incoherent, and hallucinations and delusions of various kinds. This condition may last for some time as an acute disease, and then pass away, and recovery take place; or it may degenerate into a chronic state, in which there is a persistent incoherence of ideas, and permanent delusions and hallucinations exist. The last stage of declension or degeneration is that of dementia, in which not only the organized coherence of ideas in the supreme centres is destroyed by disease, but most of the very centres of ideas themselves are disorganized and rendered incapable even of morbid function: in the extremest cases of dementia there is not the capability even of a delusion, so disorganized by the morbid degeneration is "that noblest garment of organization in which the soul is clad."

Instead of entering into a general description of the symptoms of acute mania and melancholia, I shall give an example of each of these forms of ideational insanity, interposing such commentaries as may appear necessary to elucidate the character of each, and to convey just ideas of its nature, symptoms, and course.

W. P. was a merchant, of great originality of thought and energy of character, who became insane, after making a considerable fortune entirely by his own abilities. His mother had died insane. After slight depression, and certain transactions in business, which rather astonished his friends as being opposed to his usual manner of doing things, he broke out into eccentricities and extravagances of behaviour, with which was associated an unaccustomed liveliness; in fact, he acted very much as if he were intoxicated, turning certain pictures with their faces to the wall, putting chairs in queer positions, walking about the garden bareheaded and singing; altogether he appeared joyous, and was eccentrically industrious. If spoken with, he was lively, witty, original, and satirical, laughing with a laugh of peculiar harsh and metallic ring, which he could not have imitated when in health: still he could control himself for a time, and speak with a marvellous assumption of calmness if he pleased. There was so far no positive insanity of thought, though there was great insanity of action: his condition might be said to represent an acute form of that stage of disease which has already been described as the mildest form of hereditary insanity. Degeneration proceeding, however, he became in a day or two much worse: he raved incoherently in conversation, was violent in action, and not amenable to control; his language was obscene and disgusting, his behaviour not less so; and he represented very completely the condition of a furious maniac, whose habits were of the filthiest kind: he masturbated with frenzied energy, and eagerly licked up the secretion, swallowed his urine, and painted himself with his fæces, chanting a wild chant the while, or talking in rapid incoherence. In all this extremity of fury, however, there were plainly evinced on his part a certain consciousness of his extravagances and a capability of modifying his actions in certain regards, which could not fail to give his conduct the semblance of wilful defiance and witting offence to the feelings and opinions of those who had to do with him. As the energy of this stage somewhat subsided, various delusions—as that he was made the victim of medical experiments by night and by day, but especially by night—were exhibited: the strange disease-produced feelings, nowise conforming to the order of his previous experience, and a vague feeling of being the automatic agent of morbid acts not his own, were interpreted as the results of external malicious agencies, as they were plainly not within the domain of his conscious life and voluntary control. This condition of things lasted for more than a week, after which, as the maniacal fury and delusions disappeared, there ensued a state of the profoundest moral disturbance. He was possessed with a great hatred to all those who were especially his friends; was sullen, morose, and gloomy; represented, in the unfairest way, everything which had been done to control him—and he had an excellent memory of what had been done—as a violent cruelty; misrepresented any kindness or act of attention from his relatives; refused his food or took it most capriciously; and, although all positive delusions seemed to have vanished, yet he appeared to look upon others as responsible for all his sufferings and extravagances. One might reason with him, but even if he acknowledged the justice of the arguments, which he sometimes did, it was a hypocritical affectation; for to another he would immediately afterwards set forth his unparalleled grievances in the most perverse and untrue manner—more untrue because he so completely twisted and perverted some little truth. When well, he had always displayed a scrupulous regard for truth. There was no intellectual incoherence, but marvellous ingenuity: he could assume such an appearance of calmness and logical moderation in his complaints, accusations, and statements as would deceive the very elect. And he actually succeeded in imposing upon an influential friend, who, himself a most honourable man, was so much influenced by the calmness and coherence of his stories, and by the plausible way in which he accounted for all his peculiarities, as consequences of the position in which he was placed, or slurred them over, that he represented in the strongest possible manner to his immediate relatives the injustice of keeping him longer under any sort of restraint. Accordingly, in this condition of imperfect convalescence, of unquestionable extreme moral or affective insanity, and in opposition to medical remonstrances, the patient was freed from all restraint: all the people in his neighbourhood thinking that he had been most unjustly confined. The consequence was, that in the course of a few weeks he had so managed, or rather mismanaged, his property—selling stock at great loss, and giving away large sums of money under the most singular pretences—as to afford an excellent harvest to the lawyers, and greatly to impoverish his children. It was found absolutely necessary to place him under restraint again, where he will remain doubtless for the rest of his life. For although he was apparently quite rational for three or four weeks at a time, yet the attacks of mania constantly recurred, gradually becoming more prolonged and the intervals of sanity less, until the disease acquired the character of dementia.

In this case we may observe that the first stage of the degeneration was a short period of unquiet and of unaccountable depression, which Guislain believed to occur in the great majority of instances, and which not unfrequently precedes an ordinary fever or other grave disease: it is, as it were, the projected shadow that portends a great calamity, the foreshadowing gloom or painful forefeeling of the coming storm. Afterwards there quickly followed a stage of so-called exaltation, in which the patient seemed to be in an exuberantly happy state, as though transported with some joyful tidings, and perpetrated various extravagances of speech and action as though from an overflow of life. Some have not hesitated to describe this condition as one of increased mental activity; even Schroeder van der Kolk has fallen into what we cannot but consider this great error. The real state of the patient is one of irritable weakness: he is unduly impressible, abnormally excitable, and reacts in sudden impulses of feeling, thought, speech, and action, which more resemble spasms than anything else; he is entirely incapacitated for the calm reception and discrimination of impressions, the subsequent quiet reflection, and final intelligent act of volition—the complete co-ordination of mental action, which is implied in the highest mental activity; his words and actions are like the idiot's tale, "full of sound and fury, but signifying nothing." The condition of nerve element, which is the basis of this excitability, is a reaction after the preceding depression, and it marks the commencement of a degeneration which, if not checked, will go on to the further stage of positive maniacal degeneration of mental action, like as the reaction of other kinds of organic element that have been chemically or mechanically injured passes into inflammation and purulent degeneration: it is a state of instability of composition corresponding to that which is the condition of the mildest forms of hereditary insanity, where, as already pointed out, such striking exhibitions of particular talents sometimes occur.

Striking in this case was, what is often observable in other cases, the metallic ring of the strangely altered voice. This maniacal change in the tone of voice, which is apt to grate so harshly on the sensibilities of those unaccustomed to hear it, testifies not less surely than the deranged thought, perverted sensibility, and furious conduct to the profound and general disturbance of the nervous system. "When a man is a lunatic," says Dr. Bucknill, "he is a lunatic to his finger ends:" he is alienated from himself both bodily and mentally. I cannot help making the remark here, that in almost every disease, but especially in insanity, there are a great many unobtrusive symptoms in which nature speaks that are almost entirely overlooked, attention being so much fixed on a few prominent symptoms. In insanity, for example, there is not only the changed tone of the voice, but there are peculiarities in the expression of the countenance, in the look of the eye, in the posture of the body: these constitute the physiognomy of the disease, and deserve the most exact study. I think it not impossible in many cases to determine from such signs not only whether the patient is suicidal, but in what degree he is suicidal—whether at any rate there is a desperate impulse that, like an evil fate, governs the patient and waits and watches for opportunities, or whether a fluctuating impulse is excited to activity by opportunities. Again, there are great diversities in the character of what we confound under the general name of *pain*, as well as in the character of those manifold modifications of sensibility which fall short of pain, all which have their specific meanings had we but the knowledge to interpret them. Two circumstances, noteworthy in many cases of insanity, were marked in the case under consideration: these were, the peculiar indescribable odour of the patient—the *bouquet des malades* of lunatic wards—and the intensely offensive character of the intestinal excretions. Manifestly there is some unknown chemical change produced in the excretory functions by the profound nervous disturbance, not otherwise than as secretions are observably altered in composition by passion; and the result attests, as other effects just mentioned do, the essential interaction of the mental life in the whole bodily life, and the impossibility of separating, save in thought, mental and bodily phenomena. It behoves us therefore to carry with us to the investigation of any case of insanity a deep sense of the importance of scrupulously studying every sign of physical disturbance, motor, sensory, or nutritive, as well as the prominent mental symptoms.

The third stage of degeneration exhibited by the patient was that of acute maniacal fury; of which it is not necessary to say more than to point attention to the evidence of the persistence of a certain amount of self-consciousness, and the occasional manifestation of a certain power of self-control for a moment. This is the more necessary because of the foolish criterion of responsibility sanctioned by English law, or rather by English lawyers. Certainly this patient, at all but his very worst moments, and perhaps even then, was conscious of what he was doing at the time, as he had an exact and complete memory of it afterwards, and was quite aware that it was disgusting and offensive to those around him; he had even some power of self-control at times, as he would not do before me what he would do before attendants; so that if the legal criterion of responsibility had been strictly applied to his actions, this man, suffering the extremity of maniacal disease, would not have escaped punishment. As the maniacal fury subsided and delusions appeared, the disease becoming more chronic, we might say that a fourth chronic stage was passed through—a stage characterised by the persistence of ideational disorder; that is, not only of morbid ideas, but of the morbid association of ideas, after excitement of conduct had ceased. From this the patient soon passed into the fifth, well-marked stage of affective insanity, a condition which usually lasts for some time after ideational disturbance has disappeared. The result of his premature removal, while so suffering, affords an excellent illustration of the truth of the observation of Esquirol, that the disappearance of hallucination or delusion is only a certain sign of convalescence when the patients return to their natural and original affections. At the earlier period of the disease there succeeded to this stage an interval of apparently perfect sanity before the supervention of a new attack, but as time went on this interval became less evident, and at last was omitted altogether; so that, instead of a recurrent mania, there was a continued mania established, with regular stages of exacerbation and decline, and a steady declension towards the last stage of all, that of dementia, took place.

Now if we choose to suppose, as we might not unfairly do, each of the stages of disease gone through by this patient to exist in some individual, and to constitute his permanent state—if we conceive in fact the progress of degeneration through generations instead of through the individual life—then we may form a tolerably correct idea of the varying forms of general ideational insanity that are met with. In one person the fury of action may be most marked; in another, the delirium of thought, chronic or acute; and in a third there is a predominance of the affective disorder. If we eliminate the element time in considering the course of mental disease, and do not suffer our thoughts to be constrained by it, we may certainly be enabled to get more correct views of the relations which the different forms bear to one another; the events of generations and of the individual life are brought together within the same compass of time, and pass in procession before the imagination, as it were, on the same theatre: a morbid stage, which might scarcely be noticed or might be entirely passed over on account of its rapidity and briefness in the individual, will be distinctly evolved in the progress extending through generations; and a phase of disease which might have an exaggerated importance or an independent character assigned to it in the generation will receive its right interpretation by a consideration of the course of the disease in the individual. Had this principle been at all times clearly apprehended, it may be justly questioned whether any one would have been found to doubt or misinterpret those obscurer forms of mental disease that have been the cause of so much unprofitable contention and angry feeling.

A form of most acute mania, which runs a rapid course, deserves particular attention, both on account of the rapidity of its course, the gravity of the prognosis, and the special treatment demanded. It is really an acute maniacal delirium rather than a systematized mania, the *délire aigue* of French authors, and is characterised by great excitement, entire incoherence, apparent unconsciousness of what is going on around, and extreme restlessness; the course of the disease being swift either to recovery or to death. The following example will serve to illustrate it:—A cook in a gentleman's family, whose age was not known, though plainly between forty and fifty, was rather suddenly attacked with acute mania. Nothing was known of her previous history, but she had been considered by her fellow-servants to be a little peculiar, and she had suffered from a chronic erysipelatous inflammation of one leg, which had disappeared a short time before her attack of insanity. She had been ill seven days when admitted into the hospital, and during the whole of that time had been noisy, violent, and utterly incoherent; and she had taken no food for several days. On admission her state was one of the extremest maniacal excitement: she was noisily incoherent, stripped off her clothes, rolled on the floor, was unconscious of the calls of nature, and seemingly unconscious also of what was said or done to her; she was continually spitting frothy and sticky saliva, and the look of her countenance was horrible and heart-rending. She could not be got to take food, and it was with the greatest difficulty that beef-tea, eggs, and brandy were administered to her at frequent intervals. Morphia made her sick, and did not make her sleep. This went on night and day for a week, when she was reported to have become quiet; but it was the quiet of complete exhaustion. Her pulse was so feeble and rapid that it could not be counted, though up to the moment of the collapse she had been as excited, as noisy, as restless as ever, and she still rolled on the floor, tossing her arms about and pulling at her clothes. Next day the heart beat feebly 160 times in a minute, so far as could be made out where no exact examination was possible, and with a certain undulatory action which raised the suspicion of pericarditis; but there was no increase of cardiac dulness. The skin was hot and dry; there was extreme jactitation; and she drank fluids eagerly, as she had never done before. I thought there was some abdominal tenderness on pressure, but could not be sure of it. Next day she was clearly sinking fast, and muttered words which so far as could be made out were a request for holy water: she was a Roman Catholic. Pressure on the abdomen now produced evident shrinking. On the following day she died. On examination of the body after death, the pericardium, when opened, was found not to contain a drop of fluid; its surface was dry, rough, and markedly injected, and its substance seemingly thickened generally, and certainly so in parts by oblong patches of lymph of old standing. There were similar layers of lymph on the heart, the substance of which was pale and flabby, and its cavities were full of blood, mostly uncoagulated. The intestines were almost universally of a rosy red hue, which on closer inspection was seen to be due to injected vessels. The arachnoid was slightly clouded, like glass gently breathed upon, and streaked with a delicate milky opacity along the lines of the vessels, while it was bulged at the sulci by a clear serous fluid beneath. The ventricles were filled with a similar fluid, which existed also in considerable quantity at the base of the brain. On slicing the brain numerous red spots were visible, and when the surface of the cerebellum was exposed it was seen to be strongly injected in beautiful arborescent fashion. Had the examination been carried further into the minute structure by a competent microscopist, I doubt not that the ideational cells of the cortical layers would have been found to be clouded and troubled like as the arachnoid was. The visible morbid appearances at any rate were instructive and interesting, and afforded some compensation for the painful feeling of utter helplessness which one had had in face of the disease during life. An obvious speculation as to the cause of the disease could not fail to present itself: that an erysipelas disappearing from the surface of the body had selected for attack the arachnoid and other serous membranes. Though the issue was fatal in this case, it is not so in all cases of acute maniacal delirium; it is, however, a disease which should unquestionably be regarded seriously, both on account of its occasional intractableness, and on account of the suddenness with which fatal exhaustion may supervene.

I now proceed to relate the history of a case which would usually be described as a typical example of acute melancholia, because of the fixed mental suffering that accompanied the incoherence and excitement. It was of a very extreme kind, and illustrates what an amount of consciousness may sometimes coexist with the most desperate insanity. A young woman, æt. 24, whose parents were Dissenters in a respectable position, had been religiously brought up; she had been much engaged in Sunday-school work, and had written several little tracts of more or less merit. When first seen by me she was said to have been ill for two months, but there was some probability that she had suffered for a longer period. She was miserably restless and unhappy, and wandered about moaning and exclaiming, "My poor father! My poor father!" She also spoke incoherently of the house being burnt down, and of every one in it being lost; and she made several attempts at suicide. After a little while she became still worse: she was most excited during the day, rushing wildly at any door the moment it was opened, grasping at the clothes of anyone who might enter, and clinging to them with offensive tenacity; and at night she slept not, tore to pieces bedclothes, nightdress, and whatever else she could tear, and plastered herself and her chamber with her excrement. Day by day, she seemed to get, if possible, worse and worse, gabbling automatically some such sentence as "Let me see my poor father; let me kiss my poor father," and making the most frantic rushes at any door that was opened, no matter where it led to. Night was not the time for sleep, but for the awakening of a more disgusting frenzy. Withal it was clear that, notwithstanding her terrible and distressing excitement, she knew what she was doing, and could control herself in some measure for a time; she did not like, for example, to be put in seclusion, and the threat or employment of that means of treatment had a calming effect upon her. On the whole, there was certainly an appearance of wilfulness in the worst acts of this poor woman, whom an ordinary observer would have pronounced the maddest person that he could imagine: she was perfectly conscious whether she was doing what she should do or should not do; and if a sufficiently powerful motive was excited, she could sometimes restrain the automatic utterance of her convulsive frenzy. Had the supremely absurd question whether she knew the difference beween right and wrong been put to a medical witness in her case, the reply, so far as rational answer could be made to irrational question, must needs have been, that she did. In many like instances of hereditary insanity nothing is more clear than the persistence of consciousness with the most extreme insanity of action. In this case, the so-called asylum ear,* which is ever of evil augury, appeared first on one side and then on the other, and the end was the natural end of such cases,—namely, dementia: the fury had raged out, and the calm of mental extinction followed: by making a desert of the mind there was made peace. As in the natural order of events convulsion is the forerunner of paralysis, so maniacal fury is the natural forerunner of dementia in the regular course of mental degeneration.

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* The "Insane ear"—Hæmatoma auris, or Othæmatoma—is produced by an effusion of blood under the perichondrium, which is stripped from the cartilage, or, as some hold, by an effusion within the cartilage. It may remain some time in the cystic stage, absorption finally taking place, and the ear becoming dry and shrivelled. When it appears, the prognosis is very unfavourable. Some have attributed it to a traumatic cause, but its gradual manner of coming on, its symptoms, and duration, are widely different from those of a contusion. Dr. Stiff, who has investigated its nature most carefully, believes that there is no foundation for supposing it to be produced by injury.—Hæmatoma auris, *Brit. and For. Review*, 1858.

In this case there is notable a feature which is observed also in most other cases of acute melancholia, and which, indeed, constitutes a point of difference between it and acute mania: it is the monotonous and apparently automatic character of the expression of the disease, whether in the delirious ideas or in frenzied actions. We know not why it should be so, but so it is, that the most excited melancholics exhibit far less variety in their delusions and conduct than the acute maniac. The more activity of movement there is, however, in melancholia, as the expression of the mental suffering, the more acute the utterance of the agony in gesture-language—in the wringing of the hands and the writhing of the body—the nearer does the case approach mania.

It is striking how complete in some cases of general ideational insanity is the memory of the past during the attack, and of all that has happened during the attack after it has passed off; but in other instances, especially those of acute maniacal delirium, the patient forgets altogether the events of his madness, like as a dream is forgotten, though he may remember them again during a subsequent outbreak. Immediately before a second attack it sometimes happens that thoughts and feelings displayed on the occasion of a first attack, but latent since, will reappear, so that even attendants are able to recognise the evil presage, and to predict the outbreak.

Hallucinations of the different senses are common enough in acute mania and melancholia, and illusions still more so; but both are usually of a fleeting and fluctuating character. Patients hear voices address them, see persons that have no real existence, or mistake for others those whom they really do see, taste poison in their food, smell strange odours, or feel unaccountable shocks, which they attribute to electricity or witchcraft. Some have thought that the long endurance of the great expenditure of energy in acute insanity may be owing to a perversion of the muscular sense, by reason of which the true state of the muscles is not declared in consciousness. There can be no doubt that the centres of motor residua are very much disordered, just as the centres of ideas are: a patient lying in his bed fancies, therefore, that he is moving, or that his limbs are flying through the air; he has motor illusions and hallucinations, and the muscular sense is so perverted that it cannot make known the real state of the muscles, and help to correct by its perception the deluded motor intuition. Even where there is no actual illusion of movements in acute insanity, the rapidity, confusion, and incoherence of them attest not less certainly the derangement of the motor centres; the movements are not willed, nor do ideas of them consciously precede their accomplishment, but the motor intuitions, excited into activity by disease, instigate them the moment they rise; not resting there, moreover, these carry their morbid activity into the intellectual life, and aid and abet the morbid work going on in the ideational centres.

Considering the great and continued agitation, mental and bodily, in acute insanity, the bodily functions are very little affected. In the early stage, when there is perhaps some febrile disturbance, the pulse may be a little quicker, but it is afterwards scarcely raised in frequency. The temperature of the body is slightly, if at all, increased in ordinary cases; but in cases of a typhoid type, where there are sleeplessness, restlessness, gradual wasting, and where the tendency is to death from exhaustion, it may be raised from 3 to 5 degrees above the natural standard.* In the insanity occurring after acute disease, Dr. Weber found only a slight increase of temperature, although this had been considerably raised during the previous acute disease, and immediately rose again on the occasion of a relapse.† When the temperature rises notably in a case of insanity, we may then justly suspect an attack of some other disease, or a tendency to fatal exhaustion; in either case the prognosis is made serious. The skin may be dry and harsh, but it is often moist, and of offensive odour. Dr. Sutherland thought he had discovered an excess of phosphates in the urine: were this true, it might be supposed to testify, like the very slight increase of temperature, to an abnormal disintegration of tissue; but the researches of Dr. Addison have not confirmed the statement.‡ Constipation is common, but in some cases there is an obstinate relaxation of the bowels; not unfrequently, however, these are quite natural.

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* Report on the Devon County Asylum for 1865.

† On the Delirium during the Decline of Acute Diseases, by Hermann Weber, M.D.—*Med.-Chirur. Transactions*, 1865.

‡ On the Urine of the Insane.—*Brit. and For. Review*, 1865.

Acute insanity is not often regularly progressive in its course; remissions usually take place, and sometimes there are complete intermissions, or so-called lucid intervals. When the attacks occur at regular or irregular intervals, they constitute a periodic or recurrent insanity; and when a melancholic and maniacal excitement alternate with some approach to regularity, we get what some French writers have called *folie circulaire*, or *folie à double forme*. Since the time of Esquirol there has been in France an ambition to discover a new variety of insanity, and to coin a new name for it; but the verbal distinctions have not often stood the test of exact observation. The duration of acute insanity may be for hours or months, and recovery may be sudden or gradual. A *furor transitorius* lasting for a few hours or days, and accompanied sometimes by vivid hallucinations and destructive tendencies, has been attested by so many trustworthy observers, that it is impossible to doubt its occasional occurrence; the outbreak is comparable, indeed, with an attack of epilepsy, and, well considered, is no more wonderful nor inexplicable.* Recovery, when it does take place, usually occurs within the year, and sooner and oftener in the melancholic than the maniacal form; it is rare after two years have passed; indeed, the longer the disease lasts, the worse is the prognosis, which is always unfavourable in the recurrent form, and where there is an alternation of melancholic and maniacal excitement. When recovery does not take place, the disease passes into chronic insanity, or into dementia, or ends fatally. Death may be due to exhaustion, or to some accidental disease, such as pleurisy or pneumonia. It cannot truly be said that acute insanity predisposes to diseases of the respiratory organs, but these certainly seem to occur with considerable frequency, and gangrene of the lung has many times been met with after death, especially, according to Guislain, in those who have long refused food. When maniacal exhaustion proves fatal, it sometimes does so suddenly and unexpectedly, leaving in the mind an anxious feeling of doubt whether a more energetic treatment might not have prevented death, or, if energetic treatment has been employed, whether that has not had something to do with hastening the fatal issue.

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* Numerous instances of such transitory fury are on record, and might be quoted. The following is an example:—"A sober and industrious shoemaker got up early one morning as usual to go to his work; soon after his wife was struck with his wild look and incoherent talk. He seized a knife, and rushed at his wife, who escaped. The neighbours had great difficulty in seizing and disarming him, for he defended himself with the knife. His face was flushed, his pulse full and frequent, and his body covered with perspiration. In the afternoon he became calm, and slept heavily. When he awoke in the evening he was quite himself, and remembered nothing of what had passed."—Cazauvieh, De la Monomanie Homicide, 1836. See also Virchow's *Archiv*, vol. viii. p. 192; Ueber Mania Transitoria, von Dr. Ludwig Meyer; and cases in Marc's work, De la Folie considerée dans ses Rapports avec les Questions Médico-judiciaires.

After the acute symptoms of an outbreak of insanity have subsided without recovery taking place, the chronic disease exhibits the most varied features, according to the nature of the original cause, and the extent and degree of mental degeneration. When the disease has been produced by a moral cause, there is usually considerable intellectual power apart from the delusions, or even manifested in the display of them; the case may then properly fall under partial ideational insanity. When the disease has been produced by a physical cause, or has followed a severe attack of acute insanity, there is often a great loss of mental power, together with delusions, some general feebleness, and incoherence; the morbid action has spread through the mental organization, and the case might be referred to one of the groups of dementia. Between dementia and what is described as chronic mania, the difference is only one of degree of degeneration, and examples perpetually occur that render the establishment of any definite line of division impossible. On the one hand, then, chronic insanity runs insensibly into monomania or melancholia; on the other, into dementia. The principles which guide the prognosis in these forms of mental disease will apply to it. To give an account of chronic insanity would be simply to describe, in tedious and useless detail, the physical and mental characteristics of numerous individual cases. It is important only to bear in mind, that an excellent memory and much intellectual power may co-exist with numerous extravagant delusions. A lady under my care, who fancied that not an event in Europe happened which had not some hidden relation to her and her affairs, who detected a plot against herself in the meeting of a cabinet or in the movements of a court, who heard voices from the ceiling, and who used terrible language in her frequent outbursts of excitement, had a most exact memory of all her affairs, and an acute judgment regarding them. It was only because she could not control her conduct, but threatened with a loaded pistol the lives of those whom she thought to be her enemies, that it became necessary to put her under care and control.

4. *Dementia.*—It is the natural termination of mental degeneration, whether going on in the individual or through generations; and it is accordingly in the great majority of cases chronic, and secondary to some other form of mental disease. It may, however, be both acute and primary.

Acute dementia, lasting for a few hours or days, sometimes follows a serious attempt at strangulation or drowning, or a series of epileptic fits; and in one case which came under my observation there was strong reason to believe that a masked epilepsy appeared in that guise. A man of epileptic visage, and said to have had "fits" occasionally, was suddenly, after some faintness, affected with a blank confusion of mind, entire incoherence, and complete inability to recognise anybody or anything—to remember the past or to appreciate the present; he was, in fact, completely demented. So he remained for a few days, and then got quite well. Again, the insanity which sometimes occurs after certain acute diseases, as typhus and typhoid fevers, pneumonia, acute rheumatism, may take the form of acute dementia. Lastly, it appears to be sometimes brought on suddenly by a great moral shock, and it now and then occurs in young men and women as a primary disease of unknown causation, though connected in some way probably with disturbed sexual function. A pale, delicate, fragile, blue-eyed young lady, æt. 25, came under my care after being ill for a week. She had not taken food, and was much exhausted. Her vacant wandering eyes were devoid of all intelligent perception, and her countenance was blank and expressionless. There was a restless, agitating movement to and fro of the body generally, and of the head in particular, with a low monotonous moaning. She was speechless, and it was impossible to elicit any kind of response, or to fix her attention. She took no food but what was forced into her mouth, and was inattentive to the calls of nature. Before three months were over she recovered under suitable treatment. She had suffered some disappointment of her affections; menstruation had ceased; and acute dementia followed. Another somewhat similar case was that of a young gentleman, æt. 19, of pale, delicate appearance, with large prominent grey eyes. He had for some time been worked rather hard in an office, and had not quite satisfied his friends with his mode of life out of it, when one day he was suddenly attacked with a quasi-hysterical attack of incoherency. There was blank confusion of mind; he neither uttered nor expressed otherwise anything indicating ideas in his own mind, and he showed no sign of understanding what was said by others. There were occasional periods of confused excitement. He took no food but what was forced upon him, and he was inattentive to the calls of nature. Recovery took place within a month.

These examples will serve to show the character of acute dementia, and to indicate the favourable character of the prognosis. The mental functions are abolished for the time by reason of some severe shock to their nerve centres; the expressionless countenance of the patient, his passive attitude of body, perhaps an occasional aimless and confused excitement, his inability to understand what is said, or to say anything which can be understood, and a loss of sensibility—all mark the abeyance of mental function. If a restoration does not soon take place, as in most cases it does, there is danger lest the disease pass into chronic and incurable dementia. It is hardly necessary to say that senile dementia, though primary, does not get well.

Chronic dementia is the form of dementia which we most often meet with, and we meet with every degree of mental decay in different cases. It is observed that after a very severe attack of acute insanity the evil effects are many times visible for a while in a certain condition of mental weakness without actual intellectual disorder. The force of the character seems to have been sapped, and, though perception appears to be sufficiently acute, there is some want of power of reflection; the finer feelings, moral and æsthetic especially, are gone; the physiognomy has lost its highest expression, and the individual gives the impression of a certain childishness of manner. This feebleness may gradually pass off as time goes on and strength is regained, or it may be more or less apparent for the rest of life. In the latter case, recurring attacks of positive insanity are apt to come on at uncertain intervals, and to issue finally in complete dementia. In a lady under my care, who had suffered from an attack of acute insanity when only fifteen years old, the development of the mind seemed to have been completely arrested; twenty years afterwards she had quite the appearance, manner, and mental character of a girl of fifteen; and though she had during that period three more acute attacks of derangement, these resembled in character those that occur in early life rather than such as are usually met with in adults. Between this mild form of mental weakness at one end of the scale, and the extremest examples of dementia, in which mental power is almost obliterated, at the other end, there are met with in practice cases marking every shade of the gradation.

Most of the permanent residents in asylums, those who constitute the greater part of the insane population of the country, are persons who, after mania, monomania, or melancholia, have subsided into a state of greater or less feebleness and incoherence of mind. They represent in undistinguishable varieties the shattered wrecks of the mental organization. Three main groups of them may perhaps be made. The first will consist of those who exhibit a few striking delusions which seem to be automatically expressed; for the strong self-feeling which underlies or inspires the delusions of partial ideational insanity has faded away, and they are no longer full of self-assertion, nor eager and earnest about their opinions. They quietly give utterance to the most extravagant delusions, as if they were the most ordinary truths, and, when under proper care, only get excited for a time when these are opposed or attacked. The paths of mental association are broken up, so that the delusions are cut off from any active influence upon such mental functions as are left, and all real interest in the past or the present is abolished. The actions of the patient exhibit a corresponding imbecility. Many of them are incapable of employing themselves in any useful way; a few may be induced to continue their former occupation, or to do a little work of a manual kind; while the industry of others is confined to gathering stones, sticks, and pieces of paper. Strange propensities of all kinds are exhibited, —as, for example, to stand or crouch in a particular corner, to walk backwards and forwards for a certain distance on a particular piece of ground, or to ornament fantastically the person with feathers or flowers. The mood of mind may be surly and depressed, or brisk and exalted, or placid and cheerful; it appears to be determined in great measure by the previous disposition of the patient. Hallucinations and illusions of the most extreme kind are frequent. A woman under my care used to think she ate different people in her food, and when she saw them alive still could not be persuaded that she had not eaten them: another woman may lovingly nurse as her long dead child a lump of wood decked in rags; a fourth person, whose singular movements seem unaccountable, is busy spinning sunbeams into threads; a fifth continues violent movements of his arms in order to prevent his blood from coming to a standstill. The bodily health is usually good, the patients frequently improving in this regard as the active symptoms of mania or melancholia subside into the calm of dementia.

In a second group of cases there is a more general incoherence or craziness, without any particular delusions, but with greater external activity. Although there are no distinct delusions manifest, there are evident, in the patient's incoherent babblings or his senseless parrot-like repetition of certain words, traces of such as existed in the maniacal stage. The morbid degeneration has advanced so far, that not only are the paths of association in the mind broken up, but the centres of ideas are themselves disorganized. Consequently there is an entire incapacity of fashioning into ideas the impressions made upon the senses, as well as a complete loss of memory; in extreme cases there is the incapacity even of a distinct and fixed delusion. There is sometimes an entire indifference to what is going on around, and there may be a remarkable insensibility to pain; or there are occasional violent outbreaks of incoherent passion and fury; or there may be even desperate homicidal violence. J. B. was a demented patient, utterly incoherent, who walked about muttering to himself; no one could make out what he was muttering about, for no intelligible answer could ever be got from him, yet every one who had had any experience of him had a lively and well-grounded dread of him. Without giving the slightest warning beforehand, he used, from time to time, to rush suddenly upon some one, and deal him a savage blow, or make a furious attempt to strangle him; so sudden and dangerous were these attacks that nothing would induce an attendant to sleep in the same room with him. H. P., again, was a heavy, wild-looking, hopelessly demented woman, who usually laughed vacantly when spoken to, and seemed not to comprehend anything that was said; every now and then, however, she used to begin, without any evident reason, to shriek and howl fearfully, and to stamp on the ground furiously, her whole body being agitated by a convulsive paroxysm. This fit of agitation would often issue in a murderous attack made on some one with the rush of an avalanche, while at other times she would fall down, and lie shrieking and kicking for some minutes; after which she would, with mechanical drawl, murmur, "I beg pardon," "I'm very sorry." The predominant mood is different in different cases: some are gay, happy, and prone to laugh and chatter; others are gloomy, and display the mimicry of sorrow; while others, again, are malicious, spiteful, and addicted to a purposeless mischief with a monkey-like cunning and persistence. The loss of memory is great: some have lost all remembrance of their former lives, their friends, and their own names; whilst others, who perhaps forget instantly the last thing said, can reproduce the distant past with considerable fidelity. The bodily health is usually good, and the bodily functions are well performed; some of these patients indeed get fat, and remain so till an outbreak of excitement and agitation, to which they are periodically liable, reduces them. The physiognomy is blank and expressionless, especially when the patient is addressed; it is often also prematurely aged.

Lastly, there is a group of demented patients in whom the mind is almost extinguished: who have to be fed, moved, clothed, and cared for; who evince little or no sensibility; whose only utterance is a grunt, a whine, or a cry; and whose only movements are to rub their heads or hands. Of the three degrees of dementia they represent the worst—the lowest state to which it is possible for a human being to sink. Their existence is, indeed, little more than vegetative; and if they are not carried off by pneumonia, tubercle, or some other disease, as they often are, they die from effusion on the brain, serous or hæmorrhagic, or from atrophy of the brain, or from the effects of accident, to which, through their apathetic helplessness, they are much exposed.

Though secondary dementia may last for a long time, it is impossible that recovery should take place. The condition, habits, and conduct of patients suffering from it may often be much improved by proper care and control, but their mental decay will generally go on increasing unto the end. When death takes place, it is sometimes due to effusion on the brain, or to atrophy of it; or it is produced by accidental disease, as tubercle or pneumonia.

Now that we have sketched the progress of mind through the gradual processes of its growth and development to the full evolution of its highest faculties, and have traced the steps of its degeneration and decay to its lowest degradation in apathetic dementia, we may once more call attention to the analogy between mental and spinal function. Bearing in mind that the functions are mental in one case, and in the other motor, the results of degeneration will admit of an unstrained comparison. When the spinal functions suffer, there is first a loss of power of co-ordinating the movements of the limbs,—in other words, a certain motor incoherency; when the degeneration has gone still further, there is spasmodic or convulsive muscular action, a condition heralded by twitchings and slight spasms at an earlier stage; last of all, when things have got to the worst, comes paralysis. So with regard to the morbid manifestations of diseased mind: there is first a loss of power of co-ordinating the ideas and feelings, a certain incoherence of mind; at a more advanced stage there are convulsive mental phenomena, or fixed morbid ideas, comparable to motor spasms or convulsions; and, lastly, there is extinction of mental function in dementia, as there is extinction of motor power in paralysis. If I have so far failed, however, in displaying how entirely untenable is the metaphysical conception of mind when brought face to face with facts, and in making evident how necessary it is to study the highest mental phenomena by aid of the light which a knowledge of the simplest phenomena affords us, no amount of iteration now will avail to counterbalance a failure, the cause of which must lie not so much in the difficulty of the subject, great as that is, as in the defective manner in which it has been treated.

5. *General Paralysis.*—It is a form of mental disease which, being marked by certain distinctive symptoms, it is necessary to describe separately. In the great majority of cases there are singularly exalted notions, extravagant delusions of wealth and grandeur, accompanying a gradually increasing general paralysis of the muscular system. But as cases undoubtedly occur in which there are no such exalted delusions, it is impossible to fix upon the character of the delusion as distinctive of the disease; it is necessary to define it as a form of insanity characterised by a progressive diminution of mental power, and by a paralysis which gradually increases and invades the whole muscular system.

It has an interest above that attaching to the other forms of mental disease in the fact that it selects its victims commonly from the better classes of society, and selects, again, those who seem to be buoyant with health, and at the full height of their energy; so fatal is it, too, that it may be truly said of those once attacked by it, that "in the midst of life they are in death." The most frequent cause of it is thought to be intemperance, alcoholic or sexual; but it not unfrequently occurs where there has been no reason to suspect anything of the kind. Then, however, some sort of hereditary taint is likely enough to be present. Two of the best marked examples of the disease which I have seen occurred in teetotallers, who never had been addicted to alcoholic excess; in both of them, however, there was hereditary taint; both of them had undergone the struggles and anxieties springing from a large family and a moderate business; and in both there was some reason to suspect enervating marital excess. General paralysis is emphatically the disease of manhood, for it is hardly ever met with before thirty or after sixty: the fact agrees well with the supposition that the sole cause of the disease may sometimes lie in the agitation and anxieties incident to the most active period of life. Women seldom suffer from general paralysis: they are not subjected to such severe mental activity as men are; they do not suffer so easily from sexual excess; and they are not so much addicted to alcoholic intemperance.

It has been a point of dispute amongst some writers, whether the mental symptoms precede the paralysis, or whether the latter appears first—whether the insanity is primary, or whether the paralysis is the primary and main affection, the insanity secondary and accessory. There can be no doubt in the minds of those who simply observe cases without prejudice, that the mental symptoms are witnessed in many cases before there is any trace of paralysis visible; and that in other cases the mental disorder appears simultaneously with the motor disorder. Whether instances do not occasionally occur in which the paralytic phenomena appear first, I cannot undertake to say positively; Leidesdorf has related the history of one case in which the earliest symptoms were spinal, the disease actually beginning in the cord, and one or two similar cases are on record. In 51 out of 86 cases that were carefully watched by Parchappe, the paralysis and mental disorder were simultaneous; in 27 cases the paralysis was subsequent; and in 8 the precedence could not be determined. Before asserting in a particular case that there is no evidence of paralysis, it will be well to observe the patient when emotionally excited, or after a sleepless night; then there may be exhibited a tremulousness about his speech which is not at all visible when he is perfectly calm and collected.

The motor symptoms are first evident in the tongue, which has to execute so many delicate and complex movements with such exact precision, and especially in the articulation of words abounding in consonants, where the most complex co-ordination is necessary; when the patient speaks earnestly, he does not articulate clearly, and there is a certain pause or indecision in his utterance, as if there was a difficulty in bringing out the word; when the tongue is put out, which it is with some difficulty, there is a fibrillar quivering of its muscles, but it is not pulled to one side. There is a tremulousness also in the muscles of expression when they are put in action, especially in those of the lips, which quiver as in one just about to burst into tears. These symptoms are more evident when there is any mental excitement. An inequality in the size of the pupils is often an early symptom, but it is not a characteristic one; it is sometimes present in other forms of insanity, and it is not always present in general paralysis. As the disease advances, the muscles of the limbs and trunk are affected; in walking, the feet are not quietly raised and firmly planted on the ground; the patient easily stumbles at a step, or on uneven ground, and, if asked suddenly to turn round when going straight forward, he staggers like a drunken man. Nevertheless he may be energetic in walking, setting about it earnestly, as if it were his business, and pleased with his performance of it; he does not want muscular power, but the power of using his muscles; he is unaware of his deficiencies, and commonly thinks himself wonderfully well and strong. Precise co-ordination of movement, such as is necessary for writing, sewing, and like acquired automatic acts, is lost. As the disease still advances, the articulation becomes less distinct, the walk more and more tottering, the knees fail, the patient frequently tumbles, and finally is unable to get up at all. The contractility of muscles for the electric stimulus is retained. At last the primary automatic or reflex movements fail; the pupils become dilated, but unequal in size; the sphincters lose their power, and the patient may be choked by a lump of food sticking in the pharynx and blocking up the opening of the larynx, or even getting into the larynx. Transitory contractions of an arm or leg occur sometimes, and a grinding of the teeth is not uncommon in the last stages of the disease.

Cutaneous sensibility appears to be diminished in the early stages, and towards the end it is sometimes almost lost. There are, however, occasional transitory conditions of extreme hyperæsthesia of parts, so that the patient shrieks out in agony. The muscular sense is especially affected, so that the sufferer, having lost all power of executing the more delicate and complex movements, is quite unaware of his impotence, and deems himself not less skilful than when at his best state. The special senses are not usually affected until near the end, when smell and taste are diminished or lost, and vision fails. One patient under my care, who at times used to fancy himself blind, had vivid hallucinations in the night; on one occasion he had a glorious vision of angels descending from heaven on ladders of gold, and on another, an agonizing vision of his own wife in the act of adultery.

The mental disorder is generally marked by an exaggerated feeling of personal power and importance, out of which arise corresponding delusive ideas. After a transient depression, perhaps, there takes place a marked change of character and habits: the patient exhibits unwonted perversities of feeling and conduct, such as surprise and grieve his friends; he breaks out into sexual excesses quite foreign to his usual sober character. or orders numerous valuable articles of all descriptions which he does not need and cannot pay for, or steals what strikes his fancy. Another displays considerable mental excitement; he is busy with wide-reaching projects and speculations, indifferent to the stern realities, and in all ways eager and ready to accomplish the impossible: like one in a dream, he is not limited by external conditions of time and space, from which in truth he is cut off almost as effectually as if he were dreaming with his eyes open; accordingly he finds no hindrance to a miraculous activity. A third exhibits a lack of his former energy: he is painfully troubled about little things, dull and confused in his thoughts, and demented in behaviour. As the mental disorder increases, it generally issues in incoherence and extravagant delusions as to personal power and grandeur: "The miserable sufferer who can scarcely support his tottering body avers that he has the might and vigour of Hercules; while industriously hoarding up pieces of rag, paper, or glass as articles of value, he will sign a cheque for countless millions, or make an easy present of New York; maintaining that he can command a king to do his pleasure, in the same breath he begs piteously to be allowed to go to his own humble home; or, with sexual power extinct, boasts exultantly that a princess shall be his wife and princes be born of his loins. An extreme loss of memory is in striking contrast with the semblance of exaltation: the patient forgets entirely how long he has been in confinement, or denies angrily that he has a wife, though recognising her gladly when she visits him."* Delusions of a terrific character, with accompanying great emotional depression, are found to prevail steadily throughout the course of some cases of general paralysis; and a day of great melancholic depression now and then intervenes in the course of the exalted form. A regular decline of intelligence, without any marked delusions,—in fact, a gradually increasing stupidity from the first,—is the course of one variety of general paralysis by no means of frequent occurrence. Outbreaks of great excitement and violence during the progress of the disease frequently occur: during them the temperature of the head was observed by L. Meyer to be raised, and afterwards the mental decay is found to be increased. "As the disease approaches its end, the end of life, the dementia is extreme, and the face becomes an expressionless mask, across which now and then flickers the broken ripple of a smile, or it is fixed in a ghastly sardonic grin; but even in the last stage of mental disorganization, when the capability of a distinct delusion is gone, the muttered words may be about gold, and carriages, and millions of money."

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* Article "Insanity," Reynolds's System of Medicine, vol. ii.

General paralysis is a disease of special pathological interest because of the co-existence of mental and motor disorder, not as an accidental circumstance, but as a constant occurrence. The patient loses the power of performing both ideas and movements, and gradually gets worse and worse until he dies. Many times in the course of this work I have laid stress on the manner in which movements enter into our intellectual life, and on the close analogy between ideas and motor intuitions; and now I cannot refrain from calling particular attention to the phenomena of general paralysis as confirmatory of the views enunciated. That the nervous centres of ideas are disordered is plain enough, but it is equally plain that something more than these centres is affected; for we get all kinds of morbid ideas in other forms of insanity, without any interference with motor power. Nor do the muscles themselves ail anything: the patient has not lost muscular power, but intelligent power over the muscles. In fact, what is further diseased is the region of the motor intuitions or actuation—the nervous centres in which the motor residua are organized. In progressive locomotor ataxy the motor centres are diseased, but then it is only the spinal centres, and the mind is quite clear: in general paralysis, however, those motor residua are affected which are in the closest relations with the intellectual life, indeed essential to complete intellectual action—the motor residua of speech, those which words in their intellectual meanings as symbols or signs of the ideas imply. One of the earliest symptoms of general paralysis is the difficulty noticed in giving fit outward expression to the ideas, by reason of some affection of the motor intuitions which are the internal equivalents of the words externally audible. But the mischief does not end there: not only does the morbid state of the motor centre lead to a difficulty of expression by the appropriate movements, but the diseased motor intuition enters into the intellectual life, and, in conjunction with morbid ideas there, gives rise to all sorts of extravagant and outrageous delusions as to personal power. Now it is well known that, when a delusion is fixed in the mind, the evidence of the senses does not avail to correct it—it is a morbid product, not in relation with the surroundings, but creating its own surroundings: in general paralysis the possibility of correction by the influence of external circumstances is made more hopeless, is in fact practically cut off, by the failure of the muscular sense; thereby, indeed, the avenue by which are acquired the notions of the size, form, and position of objects in space is closed, and the patient is left an easy prey to the internal disorder.*

The course of general paralysis is towards death, though not steadily so. Under proper treatment a great improvement takes place in the early stages, and the disease appears sometimes to be arrested. A few cases of actual recovery have been put on record; and, whether the recovery in such cases has been permanent or not, there can be no question that there have been in exceptional cases intermissions of such length that the disease has lasted for ten years or more. On the whole, however, it must be pronounced irregularly progressive, its duration being usually from about a few months to three years. In the more advanced stages sudden attacks of loss of consciousness with epileptiform convulsions are frequent, after which the paralysis and mental decay are both found to have increased. It has been observed by Dr. Saunders that the temperature of the body general paralysis is generally one or two degrees below t average, but that it rises during the accesses of maniacal exci ment, falling again as calmness returns. During the so-call congestive attacks, when there is complete coma or epile tiform convulsion, there is generally a considerable rise temperature: in one case the temperature was for some time 9 but it rose an hour after one of these attacks to 105°, and ne day to 106°, the patient dying in thirty-six hours from the cor mencement of the attack.* "In the last miserable stage of a when life flickers before expiration, large sloughing bedsor form, notwithstanding the best care, and diarrhœa or pneumon hastens the long-expected ending." †

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* It may be considered tolerably certain that we could not think without some means of physical expression, though thought is possible without speech. Laura Bridgman's fingers moved both during her waking thoughts and her dreams. Children who have learnt to speak, and afterwards become deaf, lose by little and little all they have learnt, unless great pains is taken with them. Note, again, how frequently deficiency of speech and movement generally accompanies the incapacity of thought in idiots. It is not difficult, therefore, to believe that the gradual failure of the power of movement in general paralysis may aggravate the mental disorder and decay.

In the following chapter it will be seen how well the morb appearances found in the bodies of those who have died fro general paralysis agree with the symptoms exhibited during li

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* Report of the Devon County Asylum for 1864.

† Article "Insanity," *op. cit.*

NOTE.

The classification of mental diseases now generally adopted in Ge many is as follows:—

I. Die Diepressionzustände.	I. Conditions of Depression.
1. Die Hypochondrie.	1. Hypochondria.
2. Die Melancholie.	2. Melancholia.
II. Die Exaltationzustände.	II. Conditions of Exaltation.
1. Die Tobsucht.	1. Acute Mania.
2. Der Wahnsinn.	2. Monomania.
III. Die psychischen Schwächezustände.	III. Conditions of Mental Wea ness.
1. Die Verrücktheit.	1. Craziness or Incoherence.
2. Der Blödsinn.	2. Dementia or Fatuity.
3. Idiotismus und Cretinismus.	3. Idiocy and Cretinism.
IV. Der paralytische Blödsinn.	IV. Paralytic Dementia.
Die allgemeine Paralysie der Irren.	General Paralysis of the Insane.

CHAPTER IV.

THE PATHOLOGY OF INSANITY.

BEFORE proceeding with the description of those morbid appearances which have been met with in insanity, it will be well to have regard to certain preliminary considerations of a general character. Already the absence of any physical appearances where psychical disorder has existed, has been dwelt upon at some length. A patient dies in a raving madness, and there is no reason disclosed by pathological observation why he should have died. Is it a right inference, then, that nerve element does not subserve mental function, or is not affected when function is affected? Certainly not: at present we know nothing whatever of the intimate constitution of nerve element and of the mode of its functional action, and it is beyond doubt that important molecular or chemical changes may take place in those inner recesses to which we have not yet gained access. Where the subtlety of nature so far exceeds the subtlety of human investigation, to conclude from the non-appearance of change to the non-existence thereof would be just as if the blind man were to maintain that there were no colours, or the deaf man to assert that there was no sound. Matter and force are necessary co-existents, and mutually suppose one another in human thought; and to speak of change in one is of necessity to imply change in the other. We cannot write the order of the variable winds or of the shifting clouds, but we are none the less certain that both clouds and winds have an order which they cannot disobey, and which we may some time discover; and so likewise we have the fullest confidence that in due time a means will be discovered of penetrating the intimate recesses of nerve life, and of making known the physical conditions of its functional manifestations.

There are numerous facts available to prove that the most serious modifications in the constitution of nerve element may take place without any knowledge of them otherwise than by the correlative change of energy. After great and prolonged mental exertion there inevitably comes exhaustion, which may be so great that the brain is utterly incapacitated for further function; a great increase of phosphates in the urine testifies to the disintegration of nerve; the individual is, so far as power of active life is concerned, almost a nonentity; and yet neither microscopist, nor morbid anatomist, would succeed in discovering any difference between the nerve substance of that man's brain and the nerve substance of the brain of one who, after due rest and nutrition, was prepared for a day of vigorous activity. The sudden shock of a powerful emotion may produce instantaneous death, just as a stroke of lightning may, and perhaps in the same way; but neither in one case nor in the other may there be any detectable morbid change. If the electric fish be persistently irritated so as to be made to give forth shock after shock, the excessive expenditure of energy leaves it utterly exhausted, and it can will no more shocks until rest and nutrition have restored its power; the nervous centres have plainly undergone some modification, though we know not the nature of it. Instead of arterial blood send through the brain blood heavily charged with carbonic acid, and the victim of the experiment must inevitably die; but who can tell the secret change that has been produced in the composition of the nerve element? Without killing a man outright, it is possible, by causing him to breathe a mixture of one part of air and three parts of carbonic acid, to render him as insensible to pain as if he had inhaled chloroform; but it is the gross result only that is recognisable by our senses. In this regard, however, the experiments of Lister on the early stages of inflammation are of some interest; for he showed that carbonic acid produced a direct sedative effect upon the elements of the tissue, paralysing for the time their vital energies; the effect being transient, and the tissue recovering its energy after a considerable time. The experiment brings us to the individual elements of the tissue, but not to the more intimate changes that take place in it. The difference may obviously be the difference between life and death, and yet there may be no appreciable physical or chemical change. As regards the morbid appearances met with in cases of insanity, there can be no question that the instances in which they are not found are becoming less frequent as investigation improves; and those who are best capable of judging, and best qualified by acquirements to give an opinion, are those who are most certain of the invariable existence of organic change. It is known that when a morbid poison acts with its greatest intensity there are fewer traces of organic alteration of structure found than when the disorder has been of a milder character; and so likewise organic change of nerve element in insanity, appreciable by the means of investigation which we now possess, may justly be expected only when the degeneration has been extreme or long continued.

1. *Physiological Researches into Nervous Function.*—The important researches into the physiology of nerve, which have been made of late years, will help to render conceivable the existence of organic change which, though undetectable, is not uncertain. It is, indeed, of the first moment that a distinct idea of nervous activity as dependent on physical and chemical processes should be formed. Because nerve is looked upon as ministering to mind, the exalted and indefinite conception of mind has reflected on its functions a sort of spirituality and unreality, and has, consciously or unconsciously, caused them to be set apart from the category of like organic processes. The metaphysically minded have not been content to declare the mind to exist independently of all the physical processes which determine the mode of its manifestations, but they have actually imposed metaphysical conceptions on nervous function as the instrument of so exalted a mission. However, the regions of the wonderful are becoming less and less as science advances its lines; and there has now been found in the electric stream a means of partially penetrating the hitherto unapproachable secret of nervous function. With the perfecting of this means, which may justly be expected in the course of time, it cannot be doubted that the knowledge of nervous activity will follow as surely as the knowledge of the heavens followed the invention of the telescope.

In the endeavours made to elucidate the mechanism of nervous action, it has already been clearly proved that time is as essential an element as it is in the motions of the heavenly bodies. A definite period of time is necessary for the propagation of a stimulus from the peripheric ending of a nerve to its central ending in the brain; and when the stimulus has arrived at the brain, a certain lapse of time, about one-tenth of a second, takes place before the will is able to transmit the message to the nerves of the muscle so as to produce motion. This time-rate of conduction varies in different persons, and at different periods in the same person, according to the degree of attention; if the attention be slight, the period is longer and less regular, but if the attention be active, then the period is very regular. But, whether the attention be great or little, a certain time must elapse from the moment of irritation of a sensory nerve to the resultant contraction of muscle; and a message from the great toe to the brain will take an appreciably longer time than a message from the ear or face. The time-rate of propagation, again, is greatly dependent upon the temperature of the nerve; cold very much diminishes it, so that the speed may be ten times less in a cold than in a normal nerve; and in a cold-blooded animal, like the frog, the rate is only about 80 feet in a second, while in man it is about 180 feet in the second. It was Haller who first proposed to measure this speed of nervous action, and he made a calculation of it in man, which was not very far from the truth; but after him no one seems to have attempted the task, and Müller even pronounced it impossible, because the time seemed infinitely little and unmeasurable. In experiments on frogs poisoned with opium or nux vomica, he could not perceive the slightest interval of time between the stimulus applied and the resulting muscular contraction. Helmholtz has since shown in the most brilliant manner that Müller was mistaken, and has, by means of a very ingenious and delicate mechanism, measured the time which elapsed between the stimulus applied and the reflex contraction: he found, too, that the stimulus required a much longer time proportionately to pass through the cells of the spinal cord than to pass along the motor and sensory nerves concerned. The rate of conduction by nerve is then not only measurable, but it is comparatively moderate—less even than the rate at which sound travels. Instead of nervous action being due to the instantaneous passage of some imponderable or psychical principle, conduction by a nerve depends upon some modification of its molecular constitution, for the accomplishment of which a certain time is essentially requisite.

Although no such researches into the cerebral centres as those made into the conditions of conduction by nerve have been made, we may not unfairly apply the analogy to psychical activity. At any rate, there can be no question that there is a considerable variation in the time in which the same mental functions are performed by different individuals, or by the same individual at different times. Such variations may depend upon original constitution, or they may be due to transitory conditions of the psychical centres. "There is," says Locke, "a kind of restiveness in almost every one's mind. Sometimes, without perceiving the cause, it will boggle and stand still, and one cannot get it a step forward; and at another time it will press forward, and there is no holding it in." The oppression of mental suffering is notably attended with great sluggishness of thought, the train of ideas seeming to stand still, and even perception being imperfect. In some forms of mental disease this defective association is well marked, whilst in others a certain sort of association is wonderfully quickened, so that ideas follow one another without restraint, or like-sounding words are strung together in the most incoherent rhymes. In many cases of affection of the brain, as in recovery from apoplectic seizure, a considerable time must elapse between a question asked of the patient and his reply: there is, as it were, a sluggishness of the mind, which perceives and reacts more slowly than natural. Such facts, proving beyond all question that the rapidity and success of mental processes are dependent upon the physical condition of the supreme nervous centres, prove also that time is an essential element in every mental function. The time-rate of the function is probably the measure of the molecular activity which is the condition of it.

But there are yet more important physiological discoveries, which may help us towards some conception of the physical conditions of mental activity. The researches of Matteucci and

Du Bois Reymond into the electrical relations of nerve have shown that there are currents of electricity engendered in nerve, as in other animal structures, which are constantly circulating in it. When the nerve is active there is a diminution of its proper current, and the needle of a galvanometer connected with it then exhibits a negative variation. It has been supposed by Matteucci that there is a rapid succession of electric discharges from nerve and muscle during activity; but, although that assumption is very doubtful, and altogether ignored by Du Bois Reymond, there can be no doubt that the negative variation of the needle of the galvanometer marks a decrease in the electromotive force of the nerve, and that this decrease is in some way "intimately related to that molecular change in the interior of the nerve, which, when it reaches the muscle, will produce contraction, or when it reaches the brain, will be received as sensation." It is to be borne in mind that every minute particle of nerve acts according to the same law as the whole nerve; the current, therefore, which a piece of nerve produces in a circuit of which it forms part, must be considered only as a derived portion of incomparably more intense currents circulating in the interior of the nerve around its ultimate particles. There is thus certain evidence, not only of the electro-motor properties of nerve, but of a modification of these during functional activity: such modification again testifying to an intimate change at any rate in the polar molecules of the nerve.

But there are yet further considerations. If a constant galvanic current be passed through a portion of nerve, it is found that not the tract of nerve only which lies between the poles, but an extra-polar portion or tract also, is put into what is called an electrotonic state. Pflüger has, in fact, shown that the nerve immediately falls into two zones, in one of which, namely, at the negative pole, the *excitability* of the nerve is increased; in the other, namely, at the positive pole, the *excitability* is diminished. The former state he has called *Katelectrotonus*—the latter, *Anelectrotonus*. A given tract of nerve is excited, therefore, through the production of katelectrotonus and the disappearance of anelectrotonus, but not through the disappearance of katelectrotonus and the appearance of anelectrotonus. Now, the ***conduction*** of a stimulus along the nerve is found to be delayed by the electroto condition of it in the polarized tract; and this delay passes to complete stoppage of conduction when the electrotonic condition reaches a certain degree, or oversteps it. The diminution of conducting power takes place both in the neighbourhood of the negative pole and in the neighbourhood of the positive pole; so that the nerve-tract near the positive pole of an electrotonic nerve is distinguished by a *decrease* of direct excitability, and by *retardation* of the speed of conduction; the nerve-tract near the negative pole, on the other hand, undergoes an *increase* of direct excitability, and a *retardation* of conducting power. These changes all agree in increasing with the increasing strength of the stream, with the increase in the time of its closure, and with the decrease of the distance of the nerve-tracts concerned from the poles. Such are the broad results of Pflüger's admirable investigations: what conclusions do they seem to point to? Considering that the states of excitability are of an opposite kind at the positive and negative poles, and considering further the sort of change which is notably produced in soft conductors by an electric stream, it is a natural inference that the physical and chemical changes of which the retardation of conduction is a result are quite different at the negative from what they are at the positive pole—in a certain regard, opposite: between the poles there being a centre of indifference at which one kind of change passes into the other. If this be so, then it is not impossible, perhaps not improbable, that the exciting operation of a galvanic stream through a nerve may lie in the *chemical effects* which the stream calls forth in the soft conductor through which it passes: the intrapolar tract of nerve behaving in every regard like polarized moist conductors, the qualities of which are more altered by the stream the nearer the tracts affected are to the two poles. The molecular process of excitation in the nerve, the passage out of the excitable into the excited condition, would then be the effect of this *electrolysis*; and the electric excitation would resolve itself into a definite form of chemical stimulus, which, like the process of giving off hydrogen during the closure of a stream, appears only at the negative pole. The analogy of the process of excitation with a product of electrolysis is not weakened by the fact that a certain time is required by a nerve, after it has been in an electrotonic state, before it recovers its full power of conduction.* Still it would be unwarrantable, in the present state of knowledge, to assume any such comparison as exact: its use is rather as an illustration from the known, in order to assist us to some kind of conception of the unknown. Chemistry must supply the groundwork of a physiology of nerve element, and on its progress the physiologist must wait; but for the full exposition of the complex phenomena of nerve function there will be needed wider science than chemistry is ever likely to furnish.

The results so far obtained prove clearly enough that nervous function is not to be embraced in any metaphysical conception, or dismissed as inexplicable, but that it is a matter for positive scientific investigation. The conducting function of nerve is shown to be a measurable process of molecular movement; the proper electrical current of nerve is diminished during its excitation, and its intimate molecular constitution modified; and there are grounds for supposing that the electric excitation of nerve results from some definite chemical change. The relation between chemical force and electric force is probably nowhere more intimate than in the phenomena of nervous action, could we only unfold their real nature.

It has been shown that with nerve as with muscle the chemical reaction becomes acid after activity, owing to the production seemingly of lactic acid; and the results of the waste through activity of nerve element are found to resemble very much those which are produced by the waste of muscle: they are such as result from the retrograde metamorphosis of the highly vital tissue, and seem to fall under two classes, one of which represents the series of fatty acids, the other that of aromatic bodies. These facts are of interest in connexion with what is known of the similar electrical relations of nerve and muscle. By means of the thermo-electrical apparatus Becquerel and Breschet have shown that a muscle rises one degree in temperature during contraction; the production of heat being due to the oxidation which then goes on, as the investigations of Ludwig—proving that the arterial blood which passes through a muscle in a state of contraction is almost completely deprived of its oxygen—and the nature of the waste products of oxidation found in muscle after contraction, indicate with sufficient clearness. During muscular contraction, then, there is not only motion, but there is an evolution of heat, together with a modification of the electrical currents of muscle and a certain chemical action; and any comprehensive theory of muscular action must be able to show how these are related to each other. The observations of Heidenhain, so far as they go, would certainly indicate that the amount of chemical action was in proportion to the sum total of latent energy made "actual" during contraction.* I am not aware that like investigations have been made into the chemical history of nerve during the exercise of function; but one may fairly assume, both from the like electrical properties and from the like products of the retrograde metamorphosis, that an absorption of oxygen and an evolution of heat are part of an undoubted chemical action. Again, then, the appeal is to the chemist to make known the nature of the intimate chemical changes.

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* Arnold von Bezold, Untersuchungen über die Electrische Erregung der Nerven und Muskeln. 1861.

I have adduced the foregoing physiological considerations to the end that they may furnish the groundwork of a just conception of the pathological phenomena: they are valuable not so much for what they actually reveal as for what they point to; and they are certainly indispensable to the formation of a consistent theory capable of binding together the many scattered facts in nerve pathology at present known, and for directing the course of future research. At the outset they prove that, so far from its being wonderful that there are no visible morbid appearances in some cases of insanity, the wonder really is that such should have been expected. It has been calculated that a distinct sensation of smell is produced by $\frac{1}{30000}$ gr. of sulphuretted hydrogen, by $\frac{1}{40000}$ gr. of bromine, by $\frac{1}{1300000}$ gr. of oil of resin, and by even a still smaller quantity of musk; and yet men familiar with these facts have thought it no inconsistency to look with the naked eye for the physical condition of delicate psychical disorder.

2. *Individuality of Nerve Element.*—Not only have the electrical properties of nerve element and the intimate che-

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* Mechanische Leistung, Wärmeentwickelung und Stoffumsatz bei der Muskelthätigkeit, von Rudolf Heidenhain.

mical changes during its function been hitherto entirely disregarded by those who have written on the pathology of insanity, but it would be no injustice to assert that nerve element itself, as a living entity, has been almost ignored. The main stress has always been laid upon the blood-vessels, as if they were the primary agents in initiating and keeping up cerebral disorder. But the truth is that the first step in insanity often is, as it is in inflammation, a direct change in the individual elements of the tissue, the change in the blood-vessels being entirely secondary. Take, for illustration, the early steps of inflammation: by the interesting observations of Professor Lister it has been made evident that, in the case of mechanical or chemical injury to some part, the elements of the tissue are directly injured; that they are brought to a lower state of life, and their functional activity impaired; as a consequence of the injury the elements are brought nearer to the condition of ordinary non-living matter, and the corpuscles of the blood exhibit a tendency to stick together in the neighbourhood of the damaged part, just as they do when brought into contact with ordinary matter after being withdrawn from the body. The dilatation of the vessels is produced indirectly through the nervous system. Observation of the effects of irritants upon the pigment-cells of the frog's skin confirmed these views: Mr. Lister found that irritants applied in such a mild form as to cause little or no derangement of the blood did nevertheless produce a certain degree of loss of power in the part to which they were applied; for there took place a diffusion of the pigment in the cells—"the visible evidence of diminished functional activity accompanying, if not preceding, the earliest approaches to inflammatory congestion," and corresponding with arterial dilatation. Experiments with carbonic acid proved that it had a powerful sedative effect upon the tissues, paralysing their vital energies so as to give rise to intense inflammatory congestion, which, however, was transient; even in amputated limbs, in which there was of course no circulation, the tissues recovered after its action, so that, as the restoration of the action of cilia separated from the body might indicate, the "tissues possess, independently of the central organ of the nervous system or of the circulation, or even of the presence of blood within the vessels, an intrinsic power of recovery from irritation, when it has not been carried beyond a certain point."[*] From which researches it plainly appears that the earliest condition of inflammation is a more or less complete suspension of functional activity in the elements of the tissue, whatever be the cause; and it is evident also that the walls of the blood-vessels are more or less deprived of their vital endowments when inflammation is established, as they then allow fibrine to pass readily through, though they repel it in health. These experimental results definitely establish the correctness of views long maintained by those philosophical pathologists who gave due weight to such phenomena as the immediate effects of mechanical and chemical injury of a part, the growth of blood-vessels in the primordial development of parts, and the increased action of one kidney and the sequent increased afflux of blood when the other is destroyed or rendered incompetent.[†]

Bearing well in mind the foregoing observations touching the direct action of the tissues, it will not be difficult to perceive how damage to the nerve elements of the brain, however caused—whether from overwork, or emotional anxiety, or some poison in the blood, or direct injury—may immediately declare itself in disordered function: the nerve element is brought to a lower state of life, and manifests its deviation from the normal state in a disturbance of function. And as in inflammation a determination of blood and an adhesion of its corpuscles follow the local mischief, so here a disturbance of the circulation inevitably follows, and in its turn becomes the cause of further mischief. One may perhaps perceive also how it is that when there is an innate feebleness of nerve element in consequence of hereditary taint insanity is produced by causes that would have no such baneful effect upon a soundly constituted brain.

The knowledge now acquired of the state of the cerebral circulation during sleep goes to prove the importance of the nerve element as individual. It has for long been the fashion to assert that there was an increased quantity of blood in the brain during natural sleep, notwithstanding that Blumenbach had noticed in the trepanned skull of a man that the brain sank during sleep, and swelled up with blood when he awakened; but the investigations of Mr. Durham, who removed portions of the skull in different animals, have distinctly shown that there is considerably less blood in the brain during sleep, its substance then becoming paler and sinking down, while it immediately swells up and becomes turgid with blood when the animal awakes.* If, mindful of the ancient maxim, *ubi stimulus ibi fluxus,* we fix attention on the individual nerve element as the active cause to which the supply of blood is to some extent secondary, it will be seen why the quantity of blood is diminished in the brain during sleep. The actively flowing stream ministers to the functional energy of the cerebral centres; but, as such function implies a waste of organic element, there must needs be a period of suspension of activity, during which renovation may take place. The function of the brain, therefore, as an organ of animal life, is suspended by recurring periods of sleep: the organic life of the brain, however, like organic life elsewhere, does not sleep, but, by the restoration of the wasted or exhausted element, lays up a store of latent energy to be made "actual" in future function. The supply of blood answers to these different states, being active when the energy is great, moderate when it is in abeyance. If the thoughts of any one wishing to go to sleep are active, there is a rapid flow of blood through the brain, and he cannot get to sleep; the stimulus of activity acts as a cause of the determination of blood, and this in its turn tends to keep up the activity. Some men under these circumstances have a certain power of inducing sleep in spite of the difficulty: by concentrating the attention on some particular mental representation, and steadily checking every tendency to revert to the exciting ideas, the excitation of the nervous centres ministering to these subsides, the circulation becomes less active, and the individual passes into sleep, though it is probably not very sound. Indeed, it were well to bear in mind that there exists the greatest variety with regard to the extent and degree of sleep, one sense being sometimes more deeply involved than another, or the same sense differently at different times. All that we are directly concerned with here, however, is the confirmation which the phenomena of sleep afford of what has been said of the primary action of nerve element as individual.

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[*] On the Early Stages of Inflammation, by J. Lister, F.R.S. *Philosophical Transactions*, vol. xxxi., 1858.

[†] General Pathology, by J. Simon, F.R.S.

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* Guy's Hospital Reports. Dr. Hammond, in an article on "Sleep and Insomnia," in the New York *Medical Journal*, vol. i. 1865, confirms Mr. Durham's experiments, and gives the observations of previous authors.

If it were desirable to multiply arguments in favour of the foregoing views of the relation of the nerve element to the circulation, one might instance the effects of its direct and rapid exhaustion. By putting any one, for example, on the rack, mentally or bodily, it is possible to produce as great nervous exhaustion in one hour as would be ordinarily produced by a day of vigorous activity; the result whereof notably is irresistible sleep. A man will sleep on the rack in the intervals of the application of the torture. Carry the exhaustion still further, the power of recovery in nerve element which, as in all organic element, is an intrinsic property, is abolished, and the sleep that occurs is the sleep from which there is no waking—the sleep that rounds off the dream of life.

When a dog is poisoned with strychnia, it may happen that there are no appreciable morbid appearances in the animal's body; but if there are any, they are such as congestion of the spinal cord, aneurismal dilatation of the capillaries, and perhaps small effusions of blood in the grey matter. Now the congestion or effusion of blood in such case is plainly a secondary result of the intensely morbid activity of the nerve elements upon which the strychnia directly acts. Here, in fact, is the abstract and brief chronicle of what happens in many cases of insanity. Transfer the convulsive action from the spinal nerve-cells to the cortical cells of the hemispheres, the result is an acute and violent mania, in which the furious morbid action of the directly poisoned nervous centres initiates an acute determination of blood. Let the disease be supposed to become chronic, the congestion of the blood-vessels may become chronic also. The common error has been to discover the pathological cause of the insanity in the congestion, in spite of the observation that it was not the way of congestion, otherwise caused, to give rise to insanity. In what is described as *Mania transitoria*, it sometimes happens that an individual falls with great suddenness into a violent fury, in which perhaps he evinces dangerous, destructive, and even homicidal tendencies: his face is flushed, his head hot, and there is plainly an active determination of blood to the brain. After a short time the attack subsides, and the man is himself again, scarcely conscious of what has happened. There is no good reason to look upon the rush of blood in such case as the active agent in the production of the fury: but there is the strongest possible reason to believe it secondary to the violent and degenerate action of the nerve centres; the attack is, in truth, an epilepsy of the cerebral centres, and the congestion takes place not otherwise than as it takes place in the spinal cord poisoned with strychnia. To the formation of correct views of the pathology of insanity it is most necessary that this order of events should be distinctly realized.

At the same time it is important not to overlook the fact that extraneous disturbances in the circulation, quantitative or qualitative, may be the direct cause of disorder of the cerebral centres. Whatever interferes with the regular supply of the proper material to be by them assimilated, and the regular removal of the waste products of functional action, so far predisposes to disease, and will specially do so where there is any innate disposition to morbid action or any prostration, otherwise caused, of nerve element. In his Lumleian Lectures, Dr. Todd much insisted upon what Andral had pointed out, namely—that an anæmic condition is favourable to the production of delirium and of coma; at the end of acute specific diseases, when the fever is over, a delirium lasting for a few days sometimes occurs, which some attribute to acute cerebral anæmia, great nervous exhaustion probably combining. The degenerate delirious activity of the nervous centres is the evidence of an exhaustion which, carried a little further, becomes coma, or extinction of functional action. That congestion or inflammation of the brain may produce serious disturbance of its functions is known to every one; but it is well worth considering how rarely congestion of the brain, originating in causes outside itself, gives rise to delirium or insanity. It is because of a diminution in the functional power of the nerve element itself, because this has been brought to a stage nearer to the condition of non-living matter, that the adherence of the blood-corpuscles and the stagnation of the blood takes place; and under such circumstances we may understand how little fitted the nervous element is to contend with the difficulties that are gathered around it. It is weak, and it is consequently miserable; evils cluster around it, and threaten to quench its life; it has more difficult work to do, and yet it is less able to do it; it responds, therefore, as weakness always does, with a convulsive or delirious energy, and, if circumstances continue very unfavourable, its activity is extinguished. May we not, then, perceive how it is that the abstraction of blood by some means from the labouring part may be beneficial in certain cases? The aim is to put the suffering part as nearly as possible in that condition in which it is during natural sleep—in a condition of rest; and the recovering power which, as we have seen, exists in the elements of a tissue, will then be under the most favourable conditions for restoring the natural state of things.*

One more consideration shall serve to exemplify the importance of the individual nerve element in the production of insanity. To surgeons it is well known that after an injury erysipelas and phlebitis, which are blood-diseases, are most apt to appear at the seat of the injury. And a true eruptive fever will do the same. Mr. Paget relates, for example, how he cut a boy for the stone, who became very ill, and seemed in danger of his life; but soon a vivid red eruption appeared at and about the wound. This was measles, earliest and most intense at the seat of the injury, just as erysipelas might have been. He has seen a similar event in a case of injured and inflamed knee with scarlet fever, and Dr. William Budd has recorded a case of small-pox which appeared most intensely over a bruise of the nates. In like manner, the nerve element, when weak by nature, or weakened by accident, is liable to be seized on by a morbid poison: it is the weak part, and therefore the sufferer. But more than that: the greatest stress has been laid, throughout this work, on the fact that traces or residua of every mental act are left behind by it, modifying henceforth the nature of the element which subserved the particular function; and indications were given that every organic element, and not that of the brain only, manifested this kind of memory. Hence it comes to pass that any tissue which has been subject to a particular morbid action is more liable to take on that kind of action again,—has, in fact, a sort of acquired disposition to it. Now this is most true of the brain, for the residua left behind by previous acts constitute almost the very nature of the elements subserving mental action. The weighty bearing, therefore, which previous habitual mental states have in the production of insanity, is revealed in this law not less surely than the predisposition to a second attack of insanity which a former attack induces. The event in each case is an illustration of a law of organic growth and action to which nervous element is subject in common with other organic elements of the body. Plainly, only by fixing attention on the individual nerve element can the shadow of a conception be formed of the manner of the degeneration which reveals itself in insanity.

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* Morel mentions the case of a man, aged 55, who was hemiplegic after cerebral hæmorrhage. His intelligence was sound, but he was morose and irritable, and weary of life. Periodically, however, he was subject to attacks, in which he complained of *blood rising to the head*; his heart beat violently; the fingers of the paralysed side contracted; he was unspeakably dejected at first, saying that he was lost; then became furious, threw himself on his wife or children, and several times attempted suicide. Blood-letting and cold to the head produced immediate calm.—*Traité des Maladies Mentales*, p. 138.

3. *Reflex Pathological Action or Pathological Sympathy.*—In discussing the causation of insanity, the general features of this kind of morbid action have been set forth; and when I come to enumerate the morbid appearances met with in the bodies of the insane, the statement of the relative frequency of disease of different organs will find its proper place. Here I take occasion only to adduce certain observations with regard to the striking manner in which diseased action of one nervous centre is sometimes suddenly transferred to another. The fact, which has lately attracted new attention, was long since noticed and commented on by Dr. Darwin:—"In some convulsive diseases," he writes, "a delirium or insanity supervenes, and the convulsions cease; and, conversely, the convulsions shall supervene, and the delirium cease. Of this I have been a witness many times a day in the paroxysms of violent epileptics; which evinces that one kind of delirium is a convulsion of the organs of sense, and that our ideas are the motions of these organs." Miss G., one of his patients, a fair young lady, with light eyes and hair, was seized with most violent convulsions of her limbs, with outrageous hic-

cough, and most vehement efforts to vomit. After nearly an hour was elapsed this tragedy ceased, and a calm, talkative delirium supervened for about another hour, and these relieved each other at intervals during the greatest part of three or four days. "After having carefully considered this disease," he says, "I thought the convulsions of her ideas less dangerous than those of her muscles," and thereupon he adopted such treatment as resulted in the young lady's recovery. In another case, which came under his observation, "these periods of convulsions, first of the muscles and then of the ideas, returned twice a day for several weeks." "Mrs. C.," again, "was seized every day, about the same hour, with violent pains in the right side of her bowels, about the situation of the lower edge of the liver, without fever, which increased for an hour or two, till it became totally intolerable. After violent screaming she fell into convulsions, which terminated sometimes in fainting, with or without stertor, as in common epilepsy; at other times a temporary insanity supervened, which continued about half an hour, and the fit ceased."* I quote these observations of Dr. Darwin with great satisfaction, because they have reference to what has only lately received due attention, and because they are examples of enlightened observation such as lie scattered through his great work. Indeed, a candid inquirer cannot but allow that the sagacious views of Dr. Darwin and Dr. Whytt, with regard to the reflex or sympathetic action of the nervous system in disease, would add something of value to the more exact knowledge of the subject which exists at the present day.

When treating of the insanity of early life, it was pointed out how commonly the morbid action of the different nervous centres were intermixed, or replaced each other; it is, in fact, in early life that this indistinguishable blending of nervous diseases, which afterwards become distinct, is most evident. Still, marked examples do now and then occur in the adult; and it is not an uncommon thing for the practical physician, watching the phenomena of actual disease of the nervous system, to have to admit the existence of strangely hybrid forms. The most interesting example, perhaps, of the transference of morbid action, or of the morbid action of one nervous centre being vicarious of that of another, is presented sometimes in the course of epilepsy. Instead of the usual attack of the peculiar convulsions, there is a sudden maniacal fury, which has been described in France as *epilepsie larvée*—latent or masked epilepsy. A young surgeon, strong and well-made, came under my care in a violent state of maniacal delirium. He had served during the Crimean war, and on his return had entered into partnership, and become engaged to a relative of his partner. Anxious on this account, and for pecuniary reasons, he had not been as temperate as he should have been; and he had had two epileptic fits at a considerable interval one from the other. On his return one day from seeing his patients, he complained of a pain in his back, and of a feeling of cold, and talked flightily. Next morning he appeared well, and was very anxious to know what he had said on the previous evening; but in the course of the day he became wildly maniacal, extremely incoherent, and very violent. So he remained for two days, when he was brought to the hospital in a strait-waistcoat. After admission he was quiet but confused, and seemed quite unaware of what position he was in; in the afternoon he slept for three hours—his sleep deep almost stertorous. On awaking he had three very severe epileptic fits in quick succession, after which a long period of comatose unconsciousness followed. On the next day he was quite composed and rational, but very weary; on the day after another acute attack of maniacal delirium occurred, from which, after a free purge, he recovered, without any other epileptic fit. In this case we may, I think, fairly believe that there was a true epileptic insanity taking the place of epileptic convulsions.

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* Zoonomia, vol. i. pp. 25, 26. Brodie relates the case of a lady who suffered for a year from persistent spasmodic contraction of the sterno-cleido-mastoid; suddenly it ceased, and she fell into a melancholy; this lasted a year; after which she recovered mentally, but the cramp of the muscle returned, and lasted for many years. In another case of his, a neuralgic condition of the vertebral column alternated with true insanity.—*Lect. on certain Local Nervous Affections.*

But there are cases, as M. Morel has pointed out, in which an epileptiform neurosis exists for a long period in an undeveloped or masked form, and gives rise to a variety of madness which is differently described as maniacal fury, or periodic mania, or instinctive mania, homicidal or suicidal, or moral insanity. In such cases, after some months, or even years, distinct epileptic attacks make their appearance, and supply the interpretation of the previously obscure insanity.

It is a characteristic of the nervous system, a property by which its internuncial function is accomplished, that the influence of an impression made at one spot is quickly communicated to a more distant part. How this takes place we know not; and, therefore, it matters not much whether we ascribe it to a *sympathy* or *consent* of parts, or to an *induction*, or an *infection*, or to a *reflex action*, or connote it by any other term which, like an algebraic symbol, may serve to express an unknown quantity. It is utterly impossible to account for its operation in disease, at one time and not at another: "Thus, what reason," asks Dr. Whytt, "can be given why sometimes, after cutting off an arm or leg, those muscles which raise the lower jaw should be affected with a spasm, rather than other muscles?" There is nothing very singular, however, in this ignorance; no one knows how it is that the irritation extends from the stimulated spot of a sensitive plant, the *Mimosa pudica* for example, so that the whole leaf contracts, and perhaps neighbouring leaves also contract; no one knows how the induction of electricity actually takes place, nor how it is that, when a point in a muscle is stimulated, the contraction extends along the fibre, nor how the interior of a nerve is actually altered when it is put into an electrotonic condition. It is none the less certain that important molecular modifications do take place in those inner recesses of nature that are impenetrable to our senses, and that they declare their insensible motions in sensible results. There is some reason to hope, however, that further researches into the electrical relations of nerve may throw light upon these phenomena of sympathetic or reflex morbid action. Call to mind for a moment what is the state of a nerve during excitation. There is then a molecular change of its interior, and the proper electrical currents are diminished, while chemical action of some kind takes place: this happening in the interior of a gland, must needs modify its invisible molecular processes, and the modification may finally be expressed in a palpable change in the secretion; in the interior of a muscle the modified molecular activity induced will issue in a manifest contraction; in a sensorial centre the modification will declare itself in a sensation; and if the molecular agitation, or whatever else we call it, affect a part which does not secrete, which is not sensitive, which has no power of contraction, it may still, nay, it must, give rise to some intimate nutritive change. Suppose a morbid centre of irritation in some abdominal organ, with which the brain is in sympathetic organic relation, to give rise to persistent excitation of the intercommunicating nerve, it is certainly not more wonderful that disturbance of cerebral activity should be produced, than that reflex movement should follow the stimulation of a centripetal nerve. But disturbance of the intimate processes of the supreme cerebral functions is neither more nor less than disorder of the organized basis of thought, the fabric of the mind. According to the degree of morbid derangement induced, therefore, will there be either a disturbance of the mental tone and general painful consciousness, or a positive perversion of ideas and an incoherence of thought.

It is most necessary to bear in mind the different ways in which sympathetic or reflex phenomena may be displayed; it would appear that, wherever there is continuity of nerve-structure, there is the possible agency of such action. It is true that the term, reflex action, is commonly used to denote the transference of excitement from a sensory to a motor nerve; but there is good reason to think that the reflexion may sometimes take place in the opposite direction—from the motor to the sensory nerve. The severe pain felt along the spine after sudden and violent coughing, or after irregular contraction of the œsophagus, the tickling in the throat after long speaking, and the increase of facial neuralgia by muscular exertion, have been adduced as examples of that mode of transference.* These are instances of *heterogeneous* sympathy, as it has been called; but the sympathy may be shown also by nerves of the same kind,—that is, it may be *homogeneous:* pain in the knee often indicates disease in the hip-joint; facial neuralgia is produced by toothache; or the pain of toothache may be felt in the opposite tooth to that which is carious. When one eye is covered, the pupil of the other dilates, which Henle attributes to the influence of the darkness diffused transversely from one nervous centre to the other. Ollivier has related the case of a person whose left leg and side had been rendered almost entirely insensible below the injury by a wound in the spinal cord of the neck; still, when the skin of this left leg was pinched, the patient had a sensation at the corresponding spot of the opposite side. *Motion* admits of sympathetic affection as well as sensation; amongst other examples, Henle quotes from Melchior the result of cutting the internal rectus of the eye; if this muscle be cut through on one side, the eye is a little turned out; if both internal recti are cut, then both eyes are strongly turned out. Again, the muscles of a paralysed limb in a hemiplegic patient will sometimes contract during some emotional or even voluntary act in which symmetrical muscles of the opposite limb take part. Of diminution or paralysis of movement by sympathetic action, there are examples in the dilatation of the blood-vessels in inflammation and in paraplegia from nephritis. When mental emotion causes the knees to shake, there is the manifestation of a transference of effect from one nervous centre to another, as there is also when different impressions on the mind instantly give the eyes either a dull, a lively, or a fierce look. To these old and familiar examples of reflex action have now to be added the effects which it is proved to produce upon nutrition and secretion, both by direct action of nerve upon the elements of the tissue, and indirectly through the blood-vessels.

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* Henle, Handbuch der Rationellen Pathologie, 1846.

After these preliminary general considerations, so necessary to the just appreciation of the morbid appearances that are met with in insanity, I now proceed to the enumeration of the results of pathological observation and to the discussion of their nature. In dealing with them it will be convenient to adopt a threefold division: 1, of those gross morbid products such as tumours, abscesses, cysticerci, &c. which, if they do affect the hemispherical cells, commonly do so indirectly; 2, those direct results of morbid action which are microscopically or otherwise discoverable in the structure of the supreme centres; and 3, those morbid conditions of other organs that have been frequently met with in the bodies of the insane.

1. *Morbid Products, such as Tumour, Abscess, Cysticercus, &c.*—Perhaps one of the most frequent observations which one has to make in the case of cerebral abscess or tumour, or often in softening, is the absence of symptoms of mental disturbance. The fact

may at first seem striking, because the presence of so much disease might scarcely be thought compatible with the undisturbed function of the brain as the organ of the mind. After giving a careful report of ten cases of tumour of the brain, Dr. Ogle calls attention to the fact that "in no case was there during life anything of the nature of mental imbecility, or any symptom of the various phases or forms of insanity." * An examination of the cases furnishes a sufficient reason for the non-affection of the intelligence: in none of the ten was there any recognised implication of the nervous centres of intelligence by the morbid action; the mischief was more or less central, and the hemispherical ganglia continued their functions, as they well might, in spite of it. If there is one thing which pathological observation plainly teaches, it is the slight irritability of the adult brain; the gradual growth of the tumour allows the brain to accommodate itself to the new conditions; and a closely adjacent nervous centre may be entirely undisturbed in function until the morbid action actually encroaches upon it. Not disease in the interior of the brain, but disease of the membranes covering it, is most likely to produce disorder of the intelligence; because in the latter case the morbid action is in close proximity to the delicate centres of intelligence, and seriously interferes with their supply of blood. An observation, therefore, which Dr. Ogle makes as the result of an analysis of his ten cases is not without interest: it is that in no case was there anything like *arachnitis* in connexion with the various growths. Whatever be the explanation, there can be no doubt of the fact that a large tumour may exist in the brain, or that a considerable amount of the brain substance may soften and undergo purulent degeneration—the pus even becoming incapsuled—without the presence of a single symptom to lead us to suspect the existence of disease in the brain.† It has even happened that a patient in hospital, who has complained only of general debility and utter inability to exertion, has been suspected of feigning and accused of indolence because there were no marked symptoms of disease, when a sudden and quick death has proved at the same time the existence of an abscess of the brain and the injustice done to the sufferer.*

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* Journal of Mental Science, July 1864: Cases of Primary Carcinoma of the Brain.

† For examples of extensive injury to the brain, without mental disturbance, see a paper by Dr. Ferriar in the first volume of the Memoirs of the Literary and Philosophical Society of Manchester.

Certainly it does sometimes happen that mental disturbance accompanies disease in the brain, even though the mischief is quite central. Two things will commonly be observable with regard to the mental symptoms in such cases:—(1) that they are intermittent, so that they may disappear altogether for a while; and (2) that they have the character either of an incoherent delirium, or of greater or less mental imbecility.

(1.) The entire disappearance for a time of all symptoms of mental disorder plainly indicates the absence of any serious organic structural change in the nervous centres which directly minister to the manifestations of mind; for, if such change existed, the recovery could not possibly be so sudden and complete. The disturbance of the cortical cells is in reality secondary: it is a reflex functional result of the primary morbid action that is going on in the neighbourhood; and it may consequently come on suddenly or pass away suddenly. This is a far more probable explanation of the transitory disorder than the assumption of a sudden vascular congestion, of which there is commonly no sign, and of the absence of which there are commonly many signs. Why such reflex effect is produced in one case and not in another, or why it is not permanent when once produced, we are no more able to say than we are to say why a like eccentric irritation should in one case give rise to tonic spasm, and in another to clonic spasm, and in a third to no spasm at all. The complete intermission of symptoms does at any rate strongly favour an explanation which recent researches into the electric relations of nerve render conceivable.

(2.) Not less favourable to the interpretation of the mental disorder as a reflex effect is the character of it; for it is manifest either in (*a*) great mental feebleness or imbecility, deepening into extreme dementia in the last stages; or (*b*) in delirium. That we do not usually meet with any of the recognised forms of insanity is a fact of some interest and importance; indicating, as it does, the existence of different organic conditions from those which exist in cases of true insanity. A systematized mania or melancholia represents a certain organized result of abnormal character, a definite morbid action—the organization, if you will, of disorder; it marks the persistence of a certain mental power, though wrongly directed, a certain co-ordination of action, though morbid action: the incoherent delirium, or mental imbecility, with which we have now to do, indicates, on the other hand, a general disturbance of the supreme centres of intelligence, without any systematization of the morbid action; the delicate fabric of thought is strangely shattered by the communicated shock, and the individual elements of this noble organization of the mind are suddenly prostrated. Hence, though the delirium may be very active, it is commonly extremely incoherent, exhibits an entire absence of co-ordination, and is the automatic expression of the fluttering action of the ganglionic cells of the hemispheres irritated into action from without. So also with regard to the imbecility, when the mental disturbance has that form; it is a general weakness without any definite character, wanting the wrecks of systematic delusions which are usually met with in the dementia following mania or melancholia. The want of definite character, then, as well as its intermittence, tends to prove that there is no definite morbid action going on within the supreme centres of consciousness; that the mental disorder is, like the general epileptiform convulsions which occur in local diseases of the brain, not the direct result of the disease, but a secondary or reflex effect.

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* Ueber Gehirnabscesse, von Prof. Dr. Lebert, Virchow's *Archiv* vol. x. 1856.

When the local disease directly implicates the supreme centres of intelligence, there may be extreme mental disorder, although it is remarkable how intermittent the symptoms even then are sometimes. The following example may serve for illustration:—A young man, æt. 24, suffered from frequent and severe periodic pains in the head, weakness of vision, anxiety, extreme feeling of debility and loss of power in the limbs; there was also confusion of thought. After a time he was seized with a maniacal attack; had hallucinations of balls of fire falling about him; thought himself pursued by monstrous forms; and was very violent. After an excitement of three days and nights without sleep, he fell into a deep sleep which lasted for twenty-four hours, and from which he awoke quite conscious, with no remembrance of his previous excitement. Again after a time headache came on, with noise in the ears, and more or less paralysis of the voluntary muscles; the maniacal excitement recurred, becoming more continuous, and the paralysis and mental stupor increased. One day he could neither stand nor move his arms; but after a tranquil night he could do both quite well, and could return intelligent answers to questions. In the evening he was again restless and excited; after which he became comatose, and died. Numerous cysts of cysticercus cellulosus were found in the brain, five of them being fixed to the inner surface of the dura mater and the rest dispersed throughout the grey matter. By far the greater number were found in the grey layers of the hemispheres, being collected here and there into dense groups. In another case, in which twelve cysticerci were found after death in the brain, the symptoms were those of gradually increasing dementia with paralysis.

It is necessary to bear in mind, however, that there may be considerable disorder or destruction of a part of the cortical layers of the hemispheres without any mental suffering. It is well known that a person may lose a part of his brain, and yet not exhibit any mental disorder; and portions of the hemispheres may be cut away without the patient feeling it, though he is fully conscious. There are, in fact, great reasons to think that one hemisphere may sometimes do the work of the whole brain; the only consequence being an earlier exhaustion by exercise, and, perhaps, a greater irritability. This being so, it is easy to perceive how direct encroachment by disease on the hemispherical grey layers may in some cases be unattended with any mental disorder.

2. *Morbid Appearances in the Brain and Membranes.*—The direct results of morbid action in the brain, discoverable by the microscope or otherwise, certainly do not admit of very definite description. Some are ready to deny that the *post-mortem* appearances in the insane throw any light on the nature of the disease; and the belief affords a comfortable excuse for shirking laborious and tedious investigation. Schroeder van der Kolk, however, held a different opinion: "More than thirty years' experience," he says, "has led me to an entirely opposite opinion, and I do not remember to have performed, during the last twenty-five years, the dissection of an insane person, who

did not afford a satisfactory explanation of the phenomena observed during life. On many occasions, I was able accurately to foretell what we should find."*

The broad result established by pathological observation undoubtedly is, that the morbid changes most constantly met with after insanity are such as affect the surface of the brain, and the membranes immediately covering it. Of these changes there is no need of discussion to prove that those in the layers of the cortical substance are the principal and essential. The evidence of more or less inflammation of the membranes, and especially a milky opacity of the arachnoid, is commonly enough met with in the bodies of those who have not died insane. Certain observations of Schroeder van der Kolk enable us to perceive how this may happen. In the first place, he has remarked that adjacent parts of different structure are not readily attacked by inflammation in equal degree: the intercostal muscles, for example, are almost unaffected when acute costal pleurisy exists; the muscular wall of the intestine is scarcely affected in peritonitis; and the heart substance remains sound, notwithstanding acute pericarditis and exudation into the pericardium. So it is with the pia mater; congestion, inflammation, and effusion may take place in it, while the brain itself is not implicated, and exudation between the arachnoid and pia mater may accordingly be found after death, when there has been no mental derangement during life. In the second place, it is necessary to bear in mind the distribution of vessels in the pia mater: Schroeder van der Kolk found that, while most of the arteries pass down from it into the substance of the brain, and are there distributed, the blood being brought back to the membrane by a corresponding series of veins, there were in addition direct channels of communication between the arteries and veins in the pia mater.† In that arrangement there is obviously a provision by which temporary disturbance of the circulation may leave the cortical layers of the brain unaffected, the storm passing over them: but for such provision, one might wonder that any one escaped serious mental disturbance, considering the frequent changes in the cerebral circulation to which every one is subject, and the extreme sensibility of nerve element. As it is, vascular disturbance does not remain entirely without effect; though the hemispheres are not themselves sensitive to pain, they manifest their altered state by a feeling of unusual irritability and a great proneness to excitement and passion; and this is a condition of things which, as every one's experience teaches him, is not so uncommon, but which mostly soon passes away with the physical cause of it.

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* On the Minute Structure and Functions of the Medulla Oblongata, p. 231.

† Die Pathologie und Therapie der psychischen Krankheiten.

There can be no question that the mind suffers when the inflammatory action in the membranes seriously implicates the adjacent cortical layers; for, without claiming acute meningitis in evidence, the morbid appearances sometimes found after acute insanity afford sufficient proofs.* In France much attention has been given to the morbid conditions of acute maniacal excitement or maniacal delirium; they are those of acute hyperæmia—namely, great injection of the pia mater with spots of ecchymosis, more or less discoloration and softening of the cortical layers—the discoloration being in red streaks or stains with spots of extravasated blood, and the softening being of a violet or pink hue—and increase of the puncta vasculosa of the white substance. As patients do not commonly die suddenly in the acute stage of insanity, this pathological condition is not often met with; and it is certainly not invariably met with when they do die in the acute stage. If we call to mind what has already been said of the relation of nerve element to the blood-supply, it will be easy to understand how this may happen, as also how, when hyperæmia is met with, it is properly to be regarded, not as direct cause of the mental disorder, but, if not as effect of it, certainly as a concomitant effect of a common cause. With due regard to this relation, it may on the whole be justly said, that the *visible* morbid appearances of acute insanity are those of acute hyperæmia of the brain. There are no recognisable differences between the morbid conditions of acute mania and acute melancholia: in the latter form of disease it more frequently happens that anatomical lesions are absent; and when they are present, they have been said to mark less hyperæmia than exists in acute mania, and to be attended with more or less serous exudation.

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* The case reported in chap. iii. p. 347, may be referred to for an account of instructive morbid appearances in acute insanity.

The cases of chronic insanity in which all anatomical lesions are wanting are rare: the longer the insanity has lasted, the more evident they usually are. In most instances there is some amount of thickening and opacity of the arachnoid observable; and many of the more advanced cases exhibit some degree of atrophy of the brain, especially of the convolutions, effusion into the sub-arachnoid space, discoloration of the cortical substance, and general hardening of the white substance. The pia mater is sometimes found to be more or less firmly and generally adherent to the surface of the brain, so that it cannot then be stripped off without tearing the latter; and a finely granular condition of the ependyma of the ventricles, with its frequent adherence to the parts beneath, would seem to testify a previous inflammatory condition: the granulations of the arachnoid, carefully described by Meyer, have probably a like interpretation. Though the adhesion of the pia mater to the surface of the brain is most frequently met with in general paralysis, it is now and then witnessed in other forms of chronic insanity, particularly in insanity after epilepsy or drunkenness.

The morbid changes which are found most frequently in general paralysis, although in rare cases they are absent, are great œdema of the membranes, adhesion of the pia mater to the surface of the brain, greyish-red local softening or discoloration of the cortical layers and superficial induration thereof, owing to an increase of the connective tissue and a destruction of the proper nervous elements. More or less atrophy of the whole brain, particularly, however, of the convolutions, is common, and is accompanied with greater firmness of its substance, enlargement of the ventricles, and serous effusion. Diffuse pachymeningitis, effusion of blood into the membranes or the layers of exudations, as described by Virchow and Rokitansky, and degeneration of the arteries, are not unfrequent. The degeneration of the nerve-substance from the increase of connective tissue has been proved by Rokitansky and others to extend sometimes even to the spinal cord. Such morbid changes are certainly more evident in general paralysis than in any other form of insanity, but they do not occur with uniform constancy, nor are they of uniform character; in some cases the meningitis being most marked, in others the atrophy of the brain, and in others the induration. Dr. Sankey has made a careful comparison of the morbid appearances met with in fifteen cases of general paralysis with those met with in fifteen cases of chronic insanity of other forms. The greatest difference was in the frequency of effusion beneath the arachnoid, which was found eleven times in the fifteen cases of general paralysis, and three times in the other cases. Adhesion of the pia mater to the grey matter occurred in eight of the general paralytics, and in only one of the others. The convolutions were abnormally open and wide apart in nine of the cases of general paralysis, and in three of the other cases; in eight of the former, again, was there a dark discoloration of the grey matter, which was met with in only three of the latter; the layers of the grey matter were indistinctly marked in ten cases of general paralysis, and in six of the other cases.* Plainly there are no morbid appearances characteristic of general paralysis, although morbid changes are more constant in it..

The late Schroeder van der Kolk has given a detailed description of several cases of what is commonly considered a very rare affection, but which he thought by no means so uncommon—namely, a diffuse inflammation of the dura mater, or idiopathic pachymeningitis. It is, he thought, often overlooked, and considered to be rheumatic headache. The symptoms are intolerable headache, delirium, sometimes calmer delusion, and coma; and after death the dura mater is found to be extensively inflamed, and more or less adherent to one or both hemispheres; the inflammation has in some cases extended to the brain, which is found to be softened. According to his experience, this affection, where neither syphilis nor injury could be assumed as cause, was not rare. A remarkable circumstance in regard to it is the regular intermissions that occur in its course, the patient having considerable intervals of apparent health.

On the authority of so eminent an observer as Schroeder van der Kolk this idiopathic inflammation of the membranes must be admitted; but it must also be allowed that the morbid appearances described by him are very like those which have since been described as almost pathognomonic of syphilis. A diffuse fibrinous exudation of low form, glueing the membranes to the brain-substance beneath, has been held to be a characteristic feature of syphilitic dementia. Instead of being diffused the exudation is sometimes circumscribed, so as to have the form of a tumour; and it may then press into the brain-substance, causing softening immediately around it. Or, again, the gum-like exudation, or *syphiloma,* as it is called, may take place as a diffuse infiltration or as a tumour within the substance of the brain, the membranes being unaffected. Such is the morbid product which recent researches have assigned to syphilis; and, according to Virchow, it consists, at the outset, like the substance of granulations, of an exuberant growth of connective tissue, its further development taking place in two directions: (1) either the formation of cells predominates, and then the intercellular substance is soft, jelly-like, mucous, or fluid, the whole mass remaining jelly-like and coherent, or undergoing purulent degeneration; (2) or the formation of cells is less prolific, and the intercellular substance increases, so that the fibres preponderate; the cells are spindle-shaped, or have the stellate form of the cells of connective tissue, or the round form of granulation cells. Ultimately yellow patches of fatty degeneration appear in it. There certainly is no character whereby this albumino-fibroid exudation can be distinguished as a specific product, and every pathologist admits the difficulty of distinguishing it from tubercle. The starting-point of its formation has been shown by Virchow to be the nuclei of the connective tissue and its equivalents; the proper elements of the organ undergoing atrophy as the result of the hypertrophy of the connective tissue.* The form of insanity with which this syphiloma is associated in its extreme stage is, as might be expected, a miserable paralytic dementia.

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* On the Pathology of General Paresis.—*Journal of Mental Science*, 1864.

Such are the morbid appearances met with in cases of insanity, a general summary of which, after Schroeder van der Kolk, may here be added:—When the patient has died at the beginning of acute insanity, and the pia mater is stripped off, the cortical layer will exhibit unequal coloration; certain convolutions being rosy, others pale. The differences are often detectable only by very careful observation; they are the results of great congestion or commencing inflammation, and are found more often in those who have died of typhus fever or after acute delirium than in insanity, because death but seldom occurs at an early stage. After a longer duration the disease appears to pass into a chronic inflammation. There is some difficulty in stripping off the pia mater, the vessels of which are strongly injected, from the surface of the brain; and portions of grey matter are sometimes brought away with it. More or less exudation commonly occurs between the arachnoid and the pia mater, and the former may form a thick, white, opaque layer, through which the convolutions are scarcely visible. After a still longer duration, when dementia is thoroughly established, there is no longer any increase of vascular injection. The vessels are less full than natural, and the pia mater may even in some cases be stripped off with more ease than in health, a clear serous fluid flowing away the while; the grey substance appears pale or anæmic, and somewhat atrophied; and the vessels, especially at the base of the brain, are beset with atheromatous patches. The degeneration extends into the ventricles, the lining membrane being thickened, and sometimes covered with fine granulations, and more or less fluid being effused into them. According to Schroeder van der Kolk, the membrane "covering the corpora striata is most thickened and cannot as a rule be stripped off without tearing the commonly softened nerve substance beneath;" this particular change being declared during life by paralytic symptoms, such as trembling of the lips, difficulty of articulation, and uncertain walk.

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* Virchow's Archiv, vol. xv. p. 217. Das Syphilom, oder die constitutionell-syphilitische Neubildung, von E. Wagner. Archiv der Heilkunde, 1863.

Interesting observations have been made upon the absolute weight of the brain, and also upon the specific gravity thereof in the insane; but further experiments on these points are yet needed. Dr. Skae and Dr. Boyd have found the absolute weight of the brain to be slightly increased in the insane, the increase being greatest in mania and least in general paralysis. The latter observer has discovered that in health the weight of the left cerebral hemisphere almost invariably exceeds that of the right by about one-eighth of an ounce.* The specific gravity of the brain in the insane was found by Dr. Skae and Dr. Sankey to exhibit an increase as compared with that in the sane; the lowest specific gravity, though still above the average, occurring in dementia, and the highest being met with in epilepsy. It appears, however, that the mode of death influences the result. Dr. Bucknill, who fixed the average specific gravity of the healthy brain at 1·036, found that in paralysis of chronic character, complicated with insanity, the specific gravity varied from 1·036 to 1·046; in paralysis terminating by coma it was 1·040, and in some acute cases it rose as high as 1·052; and in paralysis terminating by syncope or asthenia it varied from 1·036 to 1·039. The increase was ascribable in some cases to a deposit of an inert albuminous matter amongst the proper nervous elements, and to the shrinking of them. This was perhaps a morbid state not unlike that which has since been more fully investigated by Professor Albers, and described by him as parenchymatous infarction of the brain. It is often met with in typhus, and sometimes in cases of insanity, and gives rise to the condition described as *cerebral sclerosis:* the brain substance is found to be more compact and consistent than normal, and on slicing it the thin layers are tough and unusually elastic. This condition has also been met with in imbecile children in whom irregular nutrition of the cranium and the brain has probably ended in a subinflammatory state. Scrofulous parenchymatous infarction occurs sometimes in children and young people of scrofulous habit, and according to its severity and extent gives rise to different degrees of cerebral disorder, which may be arrested, or may lay the foundation of future insanity. Meckel and others have recorded instances of induration of the brain in the insane, but there was said to be no increase in the weight of the brain-substance when compared with equal portions of healthy brain, except in a slight degree in one or two examples. A fibrinous or albumino-fibroid exudation amongst the proper nerve elements is manifestly not an uncommon feature of the degeneration of extreme insanity, and appears to be strictly comparable with the result of what is described as chronic inflammation in other organs, such as the liver and the spleen. What effect it has upon the absolute weight and the specific gravity of the brain it must be the aim of future observations definitely to settle.

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* This is not confirmed by the exact investigations of Dr. Thurnam, *Journal Mental Science* April 1866.

A general survey of the foregoing morbid appearances will scarcely fail to leave a conviction of their adequate nature as signs of severe cerebral disorder. Bearing in mind that the vascular disturbance is, in the sequence of events, secondary to the discrdered action of the individual nerve elements, it is, even when only slight, of great significance, and affords sufficient evidence of primary disorder of the delicate nerve element. When it is in a condition of healthy activity, the nerve-cell maintains certain definite relations with its supply of blood; but when, from some cause, its vital power is lowered and its function disordered, immediately the relations with its surroundings are changed; the blood flowing through the (so to speak) infected districts feels the effect of the lowered vitality; the vessels dilate, and the blood-corpuscles manifest a tendency to adhere to one another and to the walls of the vessels; the abnormal vascular injection, not less than the maniacal excitement, testifies indeed to the loss of the natural vital tension and to the manifestation of an inferior activity. Carry the disturbance yet further, or prolong it, and the evidences of vital degeneration—in other words, of the resolution of higher into lower forms of life—are still more marked. The increase of the connective tissue, or the fibrinous exudation, with the atrophy of the proper nerve elements, is as plain evidence of degeneration as is the mental incoherence; and in the difference of dignity between the nerve-cell and connective tissue corpuscle there is a gap as great as that between sound mental activity and dementia.

Recent microscopical examinations of the brain after insanity have added something to our knowledge of its pathology. The most constant result has been to establish the exuberant production of connective tissue in long standing insanity, and especially in general paralysis. It is now known that there is a homogeneous matrix of connective tissue lying between and supporting the nerve elements of the brain, and continuous with the ependyma of the ventricles; it appears to be very apt, under certain circumstances, to undergo an undue increase, to the detriment of the proper elements of the part. The researches of Rokitansky and Wedl into the morbid changes in general paralysis make known a more or less diseased state of the capillaries of the cortical substance of the brain. There is a certain tortuosity of the capillaries apparent in almost every case, this being in some cases only a simple curve or twist, in others amounting to a more complex twisting, and even to little knots of varicose vessels. Dr. Sankey thinks that what Rokitansky and Wedl have described as aneurismal dilatation is really such a varicose knot. Round the capillaries and small arteries and veins there is often a hyaline deposit of what is supposed to be embryonic connective tissue, beset with oblong nuclei; this afterwards becoming more and more fibrous, so that the vessel may look like a piece of connective tissue, in which granules of fat or calcareous matter are occasionally seen. It appears that this growth of connective tissue may have its starting-point, not only from the nuclei of the walls of the blood-vessels, but also from the proper nuclei of the brain-substance. As a consequence of its exuberant increase, the nerve elements as well as the delicate capillaries are injured or destroyed; "in the grey substance the ganglionic cells appear inflated, their continuations are undoubtedly torn, and the nerve-tubes penetrating the grey substance" are destroyed. Rokitansky believes that this is not to be looked upon as an inflammatory process, and it certainly is not so in the common acceptation of the meaning of inflammation. In connexion with the hypertrophied tissue are found amyloid corpuscles, colloid corpuscles, calcareous and fatty granules—all the product of a retrograde metamorphosis going on. There are, however, two ways in which retrograde products are formed: first, there is a mal-nutrition, or a retrograde nutritive process, whereby the vitality not being at the height necessary to the production of the proper elements, there are engendered from the germinal nuclei elements of a lower kind—connective tissue instead of nerve; and, secondly, there is a retrograde metamorphosis of the formed elements of the part. The process is essentially one of vital degeneration, whether called inflammation or not; and, when we consider the genuine meaning of the pathological changes, they are seen to be in accordance with the symptoms of mental decay.

The results of an elaborate examination of the morbid changes in a case in which there was grey degeneration of the brain and spinal cord, by Dr. E. Rindfleisch, may help us to a conception of the meaning of the retrograde changes which take place in disease. The patient had died from *tabes dorsalis*; and in the anterior tracts of the cord, in the fornix, corpus callosum, and centrum ovale, the continuity of the healthy structure was interrupted by numerous patches exhibiting different degrees of degeneration, from a greyish pulp to sclerosity. In the main, Rindfleisch confirms Rokitansky: the process of degeneration seemed to begin in the vessels, as the walls of them were enormously thickened by a number of cells and nuclei, and their diameter was increased; and this first stage he considers the result of long enduring hyperæmia. The neuroglia, or hyaline connective tissue, next undergoes change, fibres being formed in the amorphous basis substance; the nerve fibres then suffer atrophy, lose their medulla, and appear to consist of axis cylinder and sheath, or of axis cylinder only. As they disappear, the connective tissue increases; numerous single nuclei appear in it, as also groups of nuclei, which seem to proceed from the division of a single nucleus. Round these groups a certain quantity of finely granular substance collects, so that cell-like bodies are formed, resembling the four-nucleated bodies described in marrow by Kölliker and Robin. The fibres of the connective tissue are formed out of the basis substance, Rindfleisch thinks, but are probably developed in organic relation to the nuclei. At a still further stage, retrogressive metamorphosis sets in: molecules of fat appear in the ganglionic cells according to Virchow, and as they increase they form granular bodies, which, however, Rokitansky holds to be produced from the fragments of the medulla of the nerve fibres. So also is it, in Rindfleisch's opinion, with the amyloid corpuscles that are found; the nucleated cells of the connective tissue go through the amyloid degeneration; and he has watched every stage of the transition from the normal cell to the amyloid corpuscle. When by fatty degeneration the greater number of nerve-cells have been converted into a detritus capable of being absorbed, the fine elastic fibres contract, get closer and closer together, and remain as the constituent tissue of the cicatrix, which sometimes causes considerable deformity; whole sections of nerve substance having been replaced by a relatively small quantity of an unyielding, compact, dry tissue. There are then three principal stages in the degenerative process:—(1) a change in the vessels, whereby there must be a great hindrance to regular nutrition; (2) atrophy of nerve element, either in consequence of the interference with its nutrition (Rindfleisch), or from the growth of connective tissue (Rokitansky); and (3) the subsequent metamorphosis of the connective tissue.*

A very careful microscopical examination of the brains of three idiots has been made by Wedl. The changes were such as are usually met with in atrophy of the cortical layers. In the pia mater and the convolutions there was local obliteration of capillaries, these sometimes having the appearance of a dirty yellowish band of connective tissue, which, like other connective tissue, swelled up and lost its wavy lines in acetic acid. Other thickenings in the capillaries of the cortical layers he describes as *colloid:* these were knotty swellings in their course that were unaffected by acetic acid. Atheromatous degeneration of arteries, veins, and capillaries was more or less marked in all the cases. In one instance the small arteries and veins, and the capillaries, were affected with funnel-like dilatations, owing to a proliferation of nuclei that lay nestled in them; and a transparent basis substance containing many oval nuclei surrounded the capillaries for some distance. The ganglionic nerve-cells exhibited some metamorphosis of their contents in all the three cases; the change consisting in a condensation of the contents with disappearance of the nuclei—a condition which called to mind the colloid degeneration of the ganglionic cells of the retina.†

It appears, then, that an increase of connective tissue, with atrophy and destruction of nerve element, so far from being peculiar to general paralysis, is of common occurrence in cerebral degeneration of long standing. There can be little doubt that the morbid product which is thought to be the result of syphilitic disease is of like nature; and Billroth found a peculiar gelatinous degeneration of the cortex of the cerebellum, which he met with in one insane person, to consist of soft connective tissue. This proliferation of connective tissue with destruction of the nerve elements has at any rate been already observed in dementia following on continued insanity, in general paralysis, in syphilitic dementia, in tabes dorsalis, and in congenital idiocy.

It will be well to enumerate briefly the different kinds of degeneration that have been met with in the brain after insanity, to the end that the nature of the retrograde changes may be more evident:—

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* Histologisches Detail zu der grauen Degeneration von Gehirn u. Rückenmark, von Dr. E. Rindfleisch.—Virchow's *Archiv*, b. vi.

† Histologische Untersuchungen über Hirntheile dreier Salzburger Idioten, von Dr. C. Wedl, Zeitschrift der K. K. Gesellschaft der Aerzte in Wien, 1863.

(*a*) There is in the most acute form of insanity an acute hyperæmia, or an early stage of *inflammatory* degeneration. Dr. Tigges has recently described an increase of nuclei in the ganglionic cells, and he believes the numerous scattered nuclei, usually thought to belong to connective tissue, to have really escaped from ganglionic cells at a later stage of their inflammatory degeneration.*

(*b*) There is that degeneration which consists in the increase of connective tissue and in the atrophy of the nerve elements. Whether called sub-inflammatory, and described as the result of a chronic hyperæmia, or not, is not of much moment so long as we keep in mind the true relations of the organic element to the supply of blood, and also the true degenerative nature of the inflammatory process. It seems indeed to admit of small doubt that an exudation of a hyaline substance into the parenchyma of the brain may take place without any signs of hyperæmia or inflammation, and without any of the products of inflammation, the exudation afterwards undergoing more or less fibrous transformation. The vitality of the part is not at the height necessary for the due formation and nutrition of the higher species of organic element, and organic elements of a lower kind are produced. When the degeneration is greater and more active, as it is in advanced inflammation, then elements are produced of a still lower kind, and incapable of any organization; they are the so-called exudation corpuscles and pus corpuscles, which are met with in inflammatory or red softening, but not in the chronic morbid changes of insanity. Thus much for the *connective-tissue degeneration.*

(*c*) *Fatty degeneration* is a retrograde change very frequently met with. It may take place either in the smaller vessels of the brain, as in atheroma, or in the proper nerve elements, or in the new morbid products. In what is known as white softening of the brain, granular bodies are found which are composed principally of fat, and which some hold to proceed from the degeneration of the natural cells of the part, while others maintain that they originate in the morbid products.* In the retrograde metamorphosis of the hypertrophied connective tissue already described, fatty degeneration takes place largely.

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* Zeitschrift für Psychiatrie, b. xx.

(*d*) *Amyloid degeneration.*—It admits of no doubt that the *corpora amylacea*, or little starch-like bodies, which are often found in great numbers in the brain, are pathological products. Wedl thinks that they should be ranked along with the so-called colloid corpuscles, and regarded as indicative of the increased exudation which may take place without hyperæmia. Rindfleisch, on the other hand, as already stated, believes that he has traced their production by a gradual transition from the nucleated cells of the connective tissue. Whatever be their true mode of origin and exact nature, there can be no question that they are products of a retrograde metamorphosis.

(*e*) *Pigmentary degeneration* is met with in the ganglionic cells of the brain in senile atrophy. Schroeder van der Kolk found the cells of the medulla spinalis and oblongata to be darker and more opaque in old age; and in one case of dementia after mania, where there was partial paralysis of the tongue, the ganglionic cells forming the nuclei of the hypoglossal nerves were in a state of blackish-brown degeneration, so that he at first mistook them for little points of blood. On more careful examination, however, they were seen to be degenerated ganglionic cells, filled with granular dark brown pigment. In regard to this form of degeneration, certain pigmentary changes that have been described in the retina are not without interest. In what is called—not very philosophically—*Retinitis pigmentosa*, there are found scattered over the fundus oculi irregular figures of deep black colour, consisting of pigment apparently in the substance of the retina. A point of interest with regard to these cases is, that they often occur in the same family, and are accompanied by general imperfection of development. Gräfe has observed this degeneration to be often of hereditary occurrence; and Liebreich has pointed out that many subjects of the defect are, like albinos, the offspring of marriages of consanguinity. More or less imperfection of the mental faculties and arrested development of the sexual organs are usually present; and the concurrence of mutism and cretinism with *Retinitis pigmentosa* is occasional. Pigmentary degeneration may surely be accepted as no less certain a mark of retrograde pathological change in the brain than it is in the retina.

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* Dr. Meschede, in Virchow's *Archiv*, 1865, describes the early morbid changes in general paralysis as inflammatory, and the later changes as those of fatty and pigmentary degeneration of the cells. In the *Journal of Mental Science*, Oct. 1866, there is an abridgment of Dr. Meschede's paper, with notes, by Dr. Blandford.

(*f*) *Calcareous degeneration.*—Granules of earthy matter are common enough in connexion with the hypertrophied connective tissue of long continued and extreme insanity. But there have been described also cases in which calcification of some of the ganglionic cells of the brain has been met with. Erlenmeyer found the commissure of the optic nerves hardened by a deposit of calcareous matter in the brain of a monomaniac who had died with epileptiform convulsions. It had been first deposited about the small arteries and in the connective tissue; and the cells had afterwards been occupied and made opaque by fine granules of what appeared to be phosphate of lime. Förster, in his Atlas of Pathological Anatomy, describes calcified cells found in the grey substance of the lumbar enlargement of the spinal cord of a boy whose lower extremities were paralysed. Heschl met with what he calls an ossification of cells in the brain of a patient, aged twenty-six, who had died melancholic: they were in the compact substance surrounding a small hæmorrhagic cavity in the cortical part of the right cerebral hemisphere. Hydrochloric acid dissolved the granular contents, and left the cells with a pale outline in view.* Dr. Wilks believes certain bodies which he found in the brain of a general paralytic, in whom the small arteries were calcified, to have been ganglionic cells that had undergone calcareous degeneration.† Not without interest is it thus to observe on a microscopical scale a similar degeneration to that which the whole organism must ultimately undergo: as the body is formed out of the dust of the earth by an upward transformation of matter and force, so by a retrograde metamorphosis of matter and correlative resolution of force does it, in parts and as a whole, return to the earth whereof it is made.

Those who duly weigh the pathological import of these different sorts of degeneration, who reflect on the great gap which there is between a calcareous granule and a nerve-cell in the economy of nature, or between a connective tissue corpuscle and a nerve-cell in the histological scale, must be constrained to admit that the difference is not less great than the difference between dementia and sound mental action, and cannot venture to assert that the morbid appearances throw no light whatever on the nature of insanity. Even the slight signs of hyperæmia are of weighty significance if their true relations are recognised, if they are viewed as results and evidence of that degeneration of individual nerve element of which the mental disorder is also result and evidence, if they and the insanity are viewed as, what they often are, concomitant effects of a common cause.

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* Schmidt's Jahrbüch, 1863.

† Journal of Mental Science, 1864.

3. *Morbid Conditions of other Organs.*—Amongst the most frequent of local diseases met with in the insane, and amongst the most frequently fatal, are diseases of the respiratory organs.

Diseases of Lung.—Many insane of low, deteriorated constitution, especially the demented paralytics, succumb to a diffuse pneumonia of low type. The usual symptoms, however, are rarely marked, being masked by the madness; there is seldom any cough, expectoration, or pain; no complaint is made; there may be little or no dyspnœa; and the only ground of diagnosis lies in the physical signs. *Gangrene of the lung* was observed by Guislain almost exclusively amongst the insane who had refused nourishment and died of exhaustion, and in as many as nine such cases out of thirteen; but it has been found since his time that the disease is not limited to those who refuse food, although especially frequent amongst them. In the Vienna Asylum there were, out of 602 *post-mortem* examinations made in three years, fifteen cases of gangrene of the lung. Pain, cough, dyspnœa, and fever are often entirely absent; there is prostration, and the extremities are cold; the complexion is dusky red, or cyanotic; the odour of the sputa and breath becomes intolerably offensive; extreme weakness is increased by diarrhœa, and death follows within a period varying from ten days to three weeks.

Almost every writer on insanity calls attention to the frequency of *phthisis pulmonalis* among the insane, although there is far from being an agreement as to the proportion of cases in which it occurs. A careful comparison of the statistics of several asylums by Von Hagen showed that on an average about one-fourth of the deaths were attributed to phthisis; this proportion really being about the same as that for the sane population above fourteen years of age. Out of 1,082 deaths which occurred in the Royal Edinburgh Asylum from the year 1842 to 1861, phthisis was the assigned cause of death in 315, or in nearly one-third (Dr. Clouston). In eight of the American asylums the deaths from consumption were, according to Dr. Workman, 27 per cent. of the whole number of deaths. Dr. Clouston has, however, proved by the examination of a series of carefully made *post-mortem* examinations that phthisis was the *assigned cause of death* in only 73 of 136 men, and in 97 of 146 women, in whose bodies tubercular deposit was actually found,—that is, in little more than half of those in whom tubercle really existed. His conclusion is, that not only is phthisis a more frequently assigned cause of death amongst the insane than amongst the sane, but that tubercular deposition is about twice as frequent in the bodies of the former as in the latter.

The relations of the phthisical to the mental disease are of some interest: in a very few cases the outbreak of the insanity seems to benefit the phthisis; in a few more, where the phthisis is chronic, an attack of insanity may be followed by the permanent disappearance of the phthisical symptoms, or attacks of mania may alternate with exacerbations of the symptoms of phthisis; but in the great majority of cases, the symptoms of the lung disease are merely masked by the insanity, the deposition of tubercle going steadily on.

Diseases of the Heart.—Observers, agreed as to the frequency of their occurrence, differ as to the proportion of cases in which they are found: Esquirol found them in one-fifteenth of his melancholic patients, Webster in one-eighth, Bayle in one-sixth, Calmeil and Thore in nearly one-third. The most reliable observations of late years tend to lessen the exaggerated proportion commonly assumed; out of 602 *post-mortem* examinations in the Vienna Asylum, affections of the heart were met with in about one-eighth of the cases; and in some of these the disease was very slight.

Diseases of the Abdominal Organs.—More or less *inflammation* of the *intestinal mucous membrane* is not uncommon among the insane. It is at the bottom of that colliquative diarrhœa which at last carries off many feeble patients, mostly those suffering from paralytic dementia, but now and then even some who are maniacal or melancholic. The changed position of the colon especially noted by Esquirol—the transverse portion of which lies in the hypogastric region or in the pelvis—is not of any real importance or of any special significance.

All sorts of disorders of one or more of the abdominal organs have been met with in particular cases, but not in any constant relation to any particular form of insanity. Rokitansky noticed a considerable increase and induration of the cœliac axis in a case of hypochondriasis with great wasting. Cancer of the stomach, liver, or of some other part has been discovered in cases where there existed during life a delusion with regard to some animal or man being present in the belly; in one case, described by Esquirol, where delusions of this sort were most extravagant, there was chronic peritonitis which had glued together the intestines. Diseases of the sexual organs are, as already pointed out, of some importance in the causation of insanity. In the female, prolapsus of the uterus, fibrous tumour of the uterus, ovarian cyst, &c. may in some few cases impart to the insanity a sexual character, or become the conditions of peculiar delusions; but in other cases of like disease there may be no sort of connexion traceable between the character of the insanity and the particular disease. Remember only that, by reason of the intimate connexion and interaction between one organ and another as parts of an organic whole, disorder of any organ must conspire with other predisposing or exciting causes to produce insanity.

CHAPTER V.

THE DIAGNOSIS OF INSANITY.

IT might seem to be no difficult matter to determine when a man's mind is unsound, and yet the diagnosis is as difficult in some cases as it is easy in others. So imperceptibly does physiological function pass into pathological function throughout the organism, that it is impossible to say where one ends and the other begins in the case of any organ: disease is not any mischievous entity that has taken possession of the body, and must be driven out of it as the evil spirit was driven out of the demoniac: it is simply vital action under other conditions than those which we agree to call natural or typical. Unsoundness of mind is that degree of deviation from healthy mental life which it is agreed by the common consent of mankind to regard as morbid. That there should be extreme uncertainty in deciding in particular cases, arises from the fact that various acts which may be the results of insanity may also be the acts of vicious or criminal persons, in whom there is no inclination to suspect disease. It will not, however, suffice to make it the positive criterion of insanity, that a man is unable to restrain his actions; for, in the first place, there are some criminals who by reason of a bad organization cannot, in face of certain temptations, control their actions; and, in the second place, there are persons unquestionably insane who are quite capable of controlling their actions, if they have a sufficiently strong motive to do so: there are some insane persons who are really criminal, on the one hand, and, on the other, there are criminals who are really insane. The experience of those connected with prisons proves, that weak-mindedness predominates in the criminal population as a class. Mr. Bruce Thomson states that, in the General Prison for Scotland, as many as one in nine, or nearly 12 per cent. were positively weak-minded, and that epilepsy is found to prevail in much larger proportion among prisoners than in the population at large.* Evidently, then, there must at times occur doubtful cases which it is uncertain whether to treat as diseased or to punish as criminal. It is not so plain, however, that the popular opinion which assumes that a rough common sense is best suited to guide the decision is correct; one cannot indeed but think that special study and experience of the phenomena of obscure disease, must furnish better grounds for a just judgment concerning it than entire ignorance can. Lord Westbury, speaking as Lord Chancellor, in the House of Lords, before he fell from the height of place which gave such weight to any opinions which he expressed, thought it not unbefitting his high intellectual and official position to condemn "the evil habit which had grown up of assuming that insanity was a physical disease, and not a subject of moral inquiry," and to affirm that it was not necessary "that a man should have studied the subject of insanity in order to form a conclusion whether a man was or was not a lunatic." It may well be doubted whether a Lord Chancellor ever before gave utterance to so erroneous, mischievous, and unfortunate an opinion. It was one which, falling in with and strengthening the current of popular prejudice, was received with applause at the time, but which cannot fail to be remembered with surprise in the future as a striking example of the utter ignorance of the nature of mental disease displayed by one of the greatest legal intellects of his day.

Acute mania is not likely to be overlooked, or to be confounded with any other disease. The only doubtful question in regard to it will be in the event of an impostor attempting to simulate it, or of a drunkard actually simulating it. Certainly he must be a clever impostor who can simulate the wild restless eye, the ceaseless movements, the quick fragmentary associations of ideas, and the volubility of utterance of acute mania so as to deceive an experienced observer; nor can he, however skilful an actor, pass days without sleep, and even weeks with only a few hours' sleep, maintaining a continual activity, as the acute maniac does. The skin in acute mania is dry and harsh, or cool and clammy, but the skin of a pretender who tries to keep up a prolonged muscular agitation will hardly fail to be hot and sweating. Delirium tremens will be distinguished by its own characteristic symptoms — the muscular tremors, the peculiar fearful illusions and hallucinations, the cold skin, feeble pulse, and the white and tremulous tongue. But there are cases in which positive insanity is produced by drink, and they are sometimes the occasion of great injustice being done by our legal tribunals: certain persons who have a strong predisposition to insanity, or who have been once insane, or who have had a severe injury of the head at some time, do actually become truly maniacal for a while after an alcoholic debauch, or are rendered temporarily maniacal—being probably thought drunk—by a very little liquor. In this condition vivid hallucinations are apt to arise, and the sufferer may perpetrate crime, not knowing afterwards what he has done, and certainly at the time not knowing the nature of the act. On one occasion I was asked to see in the gaol a respectable builder, who was undergoing imprisonment for a rape on a servant girl under fourteen years of age, and I was never more convinced of anything in my life than of the truth of the man's assertion, that he remembered nothing whatever of the crime which he had committed. He had for some time heard voices speaking to him, which had no existence out of his mind, and he had been continually drinking for some days before the crime. There was no attempt at concealment or deception; he spoke with perfect candour; and he still heard voices speaking to him through the ventilator of his cell. Many such instances have been recorded, and it is high time they were recognised by those who preside over the administration of justice: the common erroneous notion that if a person becomes furious after intemperance he must be either "mad drunk" or at most have delirium tremens has unquestionably worked much mischief. It admits of no doubt that the effect of a debauch may be a genuine acute mania, marked by active and violent delirium.

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* Journal of Mental Science, October 1866.

Chronic mania is most likely to be feigned, and if feigned with skill the imposture may deceive many. However, the impostor generally "o'ersteps the modesty of nature," and over-acts his part; he is extreme in the extravagance of what he does, while he falls short of his part in the emotional expression of the maniacal countenance. Thinking that a lunatic is widely different from a sane person, he exaggerates and rants, and produces something not like a lunatic. He pretends perhaps that he cannot remember things, as what day follows another, or how many days there are in a week, that he cannot add the simplest figures together, and acts foolishly and answers stupidly where a real lunatic who was not an idiot would act calmly and answer intelligently. If a suggestion be made incidentally of some symptom which he ought to exhibit, he may adopt the hint. The history of the case, and especially of the mode of occurrence of the disease and of the circumstance of its development, will most materially aid the diagnosis. If there be no previous history to be had, and if the patient refuse to converse, a long observation may be necessary to come to a decision. It is surprising how long an impostor will sometimes persist: one man, of whom Dr. Bucknill tells, kept up the practice of insanity for more than two years, and then broke down in his part; and another kept up the appearance of madness so long that it is uncertain to this day whether he was really insane or not. When a man feigns madness so perfectly as to deceive an experienced observer, we may hold, I think, that he is not far from being the character which he represents; for, unless there be a foundation of real madness beneath the feigned phenomena, there will be some want of coherence in them as a whole, and an incongruity with any known form of mental disease.

It may be no easy matter at times to detect partial ideational insanity where the patient is suspicious and tries to hide it. In the countenance and bearing there may be some sign visible which has its peculiar interpretation, and there are sometimes peculiarities in the dress or actions which, when bottomed, open up a secret mine of madness. Where there is no such guide for the inquiry, it will be necessary to examine the patient carefully but unobtrusively on all matters intimately touching himself; anything singular in his expressions, or any obscure references, being watched for and subsequently followed up. If he seems to pass hastily over some subject, or entirely to avoid it, he may be quietly pressed upon it. Heinroth has said, and it is popularly thought, that the insane will not *deny* their delusions, though they may *conceal* them; but this is by no means true of all cases: some will deny their delusions positively, or even explain them away as jokes, when they suspect the acknowledgment of them would be injurious. If the patient's self-love is grievously wounded, and he is made extremely angry, he may sometimes, notwithstanding his suspicion, reveal his hidden delusions. Or if he be induced to write, he may exhibit the plainest evidence of insanity, though he has managed to conceal it successfully through a long conversation. It is of course necessary to institute careful inquiry into the previous history, in order to ascertain whether there is any hereditary taint, and what degree of it; whether there has been any previous attack of insanity, and whether there has been any observed change of character and habit, especially after some efficient cause of insanity. It will sometimes happen that a patient at the outset suspects that he may be thought mad, and is earnest and vehement in accounting for his morbid feelings, and at great pains to convince others that he is not mad.

It is usually easy enough to recognise melancholia, as patients afflicted with it do not care to conceal their unhappiness and their delusions. Sometimes, however, a patient having desperate homicidal and suicidal impulses will not only conceal but positively deny their existence, in order to throw those about him off their guard, and to get the means of indulging his morbid propensities; and instances have happened in which this simulation of sanity has been successful, and homicide or suicide has been the result. Here a lawyer might argue that the deliberate concealment of the morbid impulse was ample proof of a knowledge of its nature, of a consciousness that it was wrong, and there would be reason in the argument; but when he proceeds to the further conclusion that the act is therefore a crime, and the doer of it fully responsible, it is not a logical inference, but a theoretical presumption, unfounded and unphilosophical. It confounds consciousness of an impulse or act with power of will over it, and ignores the most dangerous and the most lamentable form of insanity. When a patient has once exhibited homicidal impulse, it is necessary to observe him carefully for a considerable time before coming to the conclusion that it has left him:

when a favourable occasion offers, at an unexpected moment, the horrible propensity, latent for some time and seemingly extinct, may burst forth in violent action.

A question sometimes arises in civil and criminal trials as to the distinction between eccentricity and insanity, the attempt perhaps being made to prove an eccentric person to be insane, or to prove an insane person to be only eccentric. Now between genuine eccentricity of character and insanity there is a wide difference; the confounding of them can only proceed from a slavish conformity to that fashion of thought and action through which the original man of any epoch is so apt to be thought mad. The truly eccentric man has a strong individuality, which is expressed in all his doings, and stamps them clearly; he has but little vanity, for he is emancipated from vulgar prejudice, and heeds not the world's praise or censure; he knows that the world has ever censured great works at their birth, and would gladly have uprooted them during their early growth, and is not therefore greatly moved by its multitudinous outcry; he has broad and original views and great moral courage; he differs from the majority, perhaps, because he has outgrown the habits and superstitions to which it is in bondage. Such a man has nothing insane about him, nor is he ever likely to become insane. There is, however, a weak affectation of eccentricity which is not unlikely to end in madness: "with it are infected certain feeble-minded beings, often badly bred or badly trained, who are empty of any true individuality, but inflated with an excessive vanity; who have a small intellect, which they use in the service of their passions; who do silly and eccentric things, not unconsciously as the spontaneous expression of their nature, but out of a morbid craving to attract notice; who represent a condition of mental derangement that is the forerunner of insanity; who when they are not given up to sexual excesses are often masturbators."

When called upon to give an opinion upon a presumed case of moral insanity, it is necessary to go back carefully through the previous history, and to search for any efficient cause of mental disease, such as great moral shock, or physical injury, from which the vicious acts may be logically traced through changes of character, feelings, and habits. No one in his senses would assume vice or crime, however extreme, to be positive proof of insanity; to connect it with disease it must be traced back through a chain of morbid symptoms, marking the existence of a cause more serious than evil passion; it is important, therefore, not to confine attention to the prominent symptom, but to traverse carefully the whole affective life, in order to discover the evidences of the perversion of nature detectable in a case of true moral insanity, and to connect the morbid change with an efficient cause of disease. It is most necessary also to have careful regard to the social circumstances of the person, in order to give their proper weight to the supposed indications of insanity. When a person in good social position gets into the police-court for stealing some article of trifling value, a suspicion cannot fail to arise as to his mental state; and as a matter of fact it will probably be found on examination that he exhibits other early symptoms of general paralysis. In another case, an unaccountable perversion of feeling and conduct may be finally explained by the occurrence of epilepsy. In a third, perhaps a strong hereditary taint, hitherto latent, has been observably brought into mischievous activity by recognisable mental or bodily causes.

There is no difficulty about the diagnosis of general paralysis after it has passed its earliest stage. "It is not always easy of diagnosis before the physical signs appear; and yet a man may at this stage get into trouble—get into the police-court, or get married foolishly—entirely by reason of the disease. It is necessary to weigh carefully the character of the act—whether it is anywise explicable, or is motiveless and quite unaccountable, to mark well the state of the patient's articulation under excitement or after a sleepless night, and to attend to the great exaggeration and general extravagance of his conversation on all matters concerning himself, even when there is no fixed and positive delusion. General paralytics in the early stage speak so extravagantly and absurdly regarding things which they have seen, or events in which they have been concerned, that an inexperienced person might be apt to put down the whole as a delusion. It is needful to bear in mind that there may be some foundation of fact in what they say of themselves—that they do not at first so much invent as outrageously exaggerate. It is needful also to remember the alternations of calmness and apparent sanity which occur in the early course of the disease."*

NOTE.

In an excellent chapter on the Diagnosis of Insanity in the *Manual of Psychological Medicine*, Dr. Bucknill makes the following remarks with regard to the mode of examining a patient:—"After testing the fundamental faculties, the attention, the memory and recollection, and the judgment, which may be done by ordinary conversation on any subject, it will be well to give up the idea of any metaphysical or phrenological system of mind, and to conduct the further examination upon a plan laid down upon the active duties and relations of life. The patient may be led to give an account of his own powers of body and mind, with reference to health, to exercise, diet, and study. Thousands of delusions are entertained by insane people upon these subjects. He may then be led to converse respecting his possessions, his means of livelihood, and his hopes of advancement in rank or property; such conversation will open up the delusions of pride, ambition, and acquisitiveness. He may then be led to converse of his near relatives and friends, and especially respecting his birth and parentage, stress being laid upon his belief whether his parents were his actual and real parents. This inquiry will tend to open up any delusions respecting imaginary greatness, and any perverted emotions towards those who ought to be dear to him. The subject of religious opinion may then be introduced. The religious devotions and exercises which he practises may be inquired into, with the reasonable expectation of finding insane delusions on a subject which touches the deepest sentiments of the soul. If the patient is an educated man, it will be right to converse with him upon politics and science. If he can stand the test of a discriminating inquiry on these and similar subjects, he certainly cannot be the subject of mania; and if he has any delusions, he must either retain the power of hiding them, or they must exist in some obscure corner of the brain, from which they are little likely to influence, with any force, the opinions, the feelings, or the conduct."

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* From the Author's article on Insanity in Reynolds's System of Medicine, vol. ii.

CHAPTER VI.

THE PROGNOSIS OF INSANITY.

WHAT danger there is to life, and what probability there is of recovery, are the two questions of almost equal moment which press forward for determination in any case of insanity. In respect of the first question, it may be said that, though insanity certainly does upon the whole reduce the mean duration of life, and much more so in its recent acute forms than in its more chronic forms, yet it is not in the majority of cases a disease directly dangerous to life. General paralysis does, however, pass steadily to a fatal ending, and usually within two years from its commencement. Now and then an instance of recovery has been mentioned, but it has seldom been allowed to pass unquestioned. Both acute mania and acute melancholia sometimes end fatally in a sudden manner by exhaustion, especially where a persistent refusal of food has accompanied continued excitement, agitation, and sleeplessness; the prognosis in such case being very much influenced, for better or worse, according as food is taken or not. When the temperature of the body rises some degrees above the natural standard, it is a sign of bad omen; for, though it may not indicate an immediate fatal termination, it marks increasing organic mischief that must before long end fatally; in the attacks of excitement, for example, which occur in the course of general paralysis, the temperature rises, falling again as they pass off; and in the recurring attacks of excitement in some cases of dementia, where there appears to be an actual slow softening of the brain, advancing by periodical starts, the temperature will rise some degrees during the exacerbations, sinking afterwards to its natural standard. It would cause no surprise if convulsions ensued during any of these attacks, and death soon followed, though they may go on being repeated for months before such an end comes. Any indication of motor paralysis, or any kind of hybrid epileptiform convulsion, or even a recurring subsultus in the muscles of one arm, is of evil omen; but an attack of genuine epilepsy, though unfavourable as regards the prospect of recovery, is not so as regards life. Where there is nothing in the disease itself to directly endanger life, the patient may still die from exhaustion when a persistent steady refusal of food has not been overcome. In melancholic patients afflicted with suicidal impulse, as many of them are, an unremitting and watchfulcare will be necessary to prevent a self-inflicted death.

What probability there is of recovery in a particular case will depend greatly upon the duration of the disease, upon the cause of it, and upon the form which it takes. As a general rule, the more recent the outbreak the better is the chance of recovery; the expectation of which, when proper treatment has been adopted from within three months from the commencement, is about four to one, while it is hardly as much as one to four after the disease has lasted twelve months. Undoubtedly there do occur instances in which patients recover after being insane for years, but they are exceptional: when a pathological habit has been thoroughly established in the mind, it continues almost as naturally as the normal physiological habit. The hope of recovery is entirely gone when the stage of secondary dementia, incoherent or apathetic, has been reached.

Looking to the forms of mental disease, it will be found that melancholia is the most curable, acute mania coming next in order. When the maniacal fury is subsiding, the prospect is good if the patient is sad and depressed, begins to inquire about his family, friends, and business, and to evince other signs of a return to his former feelings and interests; it is bad if the feelings remain unmoved and the intellect is calm in its disorder —if, in other words, there is evidence of the organization of disorder. Even the disappearance of intellectual derangement is not a certain sign of recovery unless there is a return to the old healthy feelings, and the patient is conscious that he has been insane; if this happy change does not take place, a recurrence of the attack may be looked for. And a periodical recurrence of the attacks is of extremely unfavourable augury; the attacks becoming longer, the intermissions briefer, and the decline to dementia being steadily certain. A day of depression and weeping intervening in the course of acute mania is of good omen; but when attacks of mania and melancholia regularly alternate, the prognosis is very unfavourable.

Chronic mania and monomania, once they are established, allow very small hope of recovery. In rare instances it may take place under the influence of systematic moral discipline, or in consequence of some great shock to the system, which may be due either to a strong emotional affection or to the effects of some intercurrent disease. Where there is a fixed delusion in a melancholic patient that the cause of his misery is in some external agency, the prognosis is unfavourable; but it is more favourable in the melancholic who attributes his suffering to imaginary backslidings of his own. In like manner the homicidal patient who believes himself the victim of persecution seldom recovers, while the suicidal patient generally does recover, particularly after some serious and all but successful suicidal attempt. In moral insanity the prognosis is bad; the symptoms commonly indicating the tyranny of a bad organization. Acute primary dementia is in most cases curable by proper treatment applied in due time.

When insanity has been slowly developed, the prognosis is less favourable than when it has been of sudden origin. The reason of this will appear when we reflect that it is usually, when slowly developed, produced as an exaggeration of some peculiarity of character, and marks the establishment of a definite type of morbid action of a chronic nature; but that, when suddenly caused, it is produced by some severe moral or physical shock, and may indicate no more than the disturbance of the mental equilibrium. For a like reason a frequent alternation of symptoms of active disease is more hopeful than a steady persistence in a particular group of quiet symptoms. The popular belief that hereditary insanity is not likely to get well is not warranted by experience; but the disease is more likely to recur than when it is not of hereditary origin. In the acute mania sometimes produced by drunkenness the prognosis is good; it is bad in those cases in which a continued steady intemperance, associated sometimes with hereditary predisposition, has resulted in mental weakness or dementia. When insanity has been caused by habits of self-abuse or by sexual excesses, the prognosis is unfavourable in all but the earliest stages. If religious excitement purely has been the cause of an outbreak, recovery may be looked for with confidence; but where religious display is the garb which a pride or vanity of disposition has assumed, the outlook is very unfavourable. Where disease of brain, or injury of the head, or epilepsy, has been the cause of the mental derangement, it is practically incurable; but where it occurs during the decline of some acute disease, it is generally curable. The prognosis is favourable in hysterical insanity; it is even more favourable in puerperal mania, and this though there may have been attacks in previous confinements. Indeed, when two or three previous attacks of insanity have been recovered from, there is always good ground of hope of one more recovery, though the final issue will probably be dementia. A decidedly bad symptom is a fixed hallucination, as is also a complete preservation of bodily health along with a persistence of the mental disorder: when there is palpable bodily disorder, as digestive disturbance, anæmia, menstrual irregularity, there is good hope that, with the restoration of bodily health, the mind may be restored also. When insanity is associated with phthisis, the prognosis is unfavourable both as regards recovery and as regards life; diseases of the respiratory organs, among which phthisis holds the first place, are the diseases most fatal to the insane in asylums.

The most favourable age for recovery is youth, the probability of it diminishing with the advance of life, and few recovering after fifty: as many as 86 per cent. of males, and 91 per cent. of females, attacked with mania under twenty years of age, recovered at the Somerset Asylum, according to Dr. Boyd's tables. The recoveries among women exceed those among men, owing probably to the frequency and fatality of general paralysis among men.

The broad conclusion which Dr. Thurnam came to on the basis of his careful statistics was that, "as regards the recoveries established during any considerable period—say twenty years—a proportion of much less than 40 per cent. of the admissions is under ordinary circumstances to be regarded as a low proportion, and one much exceeding 45 per cent. as a high proportion."* The liability, however, to recurrence of the insanity after recovery from the first attack cannot, he thinks, be estimated at less than 50 per cent., or as one in every two cases discharged recovered. On the whole, then, he holds that of ten persons attacked five recover, and five die insane sooner or later. Of the five recoveries not more than two remain well during the rest of their lives; the others have subsequent attacks, it may be after long intervals, during which at least two of them die.

In concluding this chapter I cannot forbear remarking that in insanity, all question of the intrinsic nature of the disease put aside, the prognosis is often materially influenced by extraneous circumstances—the behaviour of those relatives and friends of the patient who are most nearly interested in him. It admits of no doubt that in some cases the eager impatience, the restless anxieties, the meddlesome interference, and the quarrels of friends thwart the best efforts of the physician. Sincere and sound advice, founded on experience, is not adopted, or, if adopted, not steadily followed; meanwhile that time in which there is the best hope, and sometimes the only hope, from treatment passes; and the period of recovery is delayed, if the progress of it is not arrested. It is not an unwarrantable assertion to make, that some insane people have owed their life-long mental affliction to the injudicious conduct of those to whom they were most dear.

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* On the Statistics of Insanity, by J. Thurnam, M.D.

CHAPTER VII.

THE TREATMENT OF INSANITY.

IT may be safely said that in no other disease are the difficulties of treatment so great as they are in insanity; for they are not only difficulties appertaining to the nature of an obscure disease, but they are increased and multiplied by the social prejudices attaching to it; by the frequent concealment and misrepresentation, witting and unwitting, on the part of the friends of a patient; by the unsatisfactory character and position of the institutions especially established for the reception of insane persons; and, in some measure also, by the tendency of recent lunacy legislation, which has suffered not a little from popular panic and professional philanthropy. The practical result of laws eagerly and hastily made under the influence of popular excitement and clamour has unquestionably been in some respects prejudicial to the true interests of the insane. The land has been covered with overgrown and overcrowded asylums to which almost the whole lunatic population of the country has been consigned, while the greatest difficulties have been put in the way of the early treatment of insanity. No one who has had experience of the working of the Lunacy Acts in England can feel altogether satisfied with the results. That there has been a steady increase of 1,000 patients a year in the asylums of England and Wales during the last fifteen years may be good evidence of the close supervision exercised over them, but it is not convincing evidence that all has been done which can be done to secure the best medical treatment of those who are curable and the greatest comfort of those who are incurable.

It would not be difficult to show that the iniquities practised upon the insane in olden times, the countless unnecessary and cruel sufferings which they underwent, originated fundamentally in the shame, horror, and dread of insanity which still infect the public mind. Whether these unjust feelings were legacies from that ancient superstition which regarded an insane person as tormented with an evil spirit in consequence of some great sin committed by him or his parents, it is needless to inquire here; suffice it to say that the cruel feelings of suspicion and fear inspired a most cruel practice. To shut the insane up from gaze, and, if possible, from memory, to be rid at any cost of their offending presence,—that was the one thing to be done, and fit implements were not wanting to do it. Consequently it happened that infinite cruelties grew up and flourished under the influence of false views and hostile feelings with regard to them; and to be the victim of the most pitiful of diseases became a reason, not for undergoing proper medical treatment, but for enduring the severest punishments. The memory of this iniquitous past is thought to justify, and certainly strengthens, the public jealousy of asylums and those who superintend them now; they are weighted with an inherited odium; and a stringent legislation, designed to mitigate the uneasiness of the public conscience on account of the real horror of the insane which is still felt, and to condone past sins, does not conduce altogether to their best interests.

It is by no means an unnecessary thing to watch carefully any public action taken in regard to the insane; for it is very certain that the people have not been in times past, and are not now, their true friends: the vulgar fear or horror of them has always prevented that, and the social disgrace thought to attach to insanity still prevents a genuine reform of opinion. How often did Pinel appeal, and appeal in vain, to the authorities before he was permitted to make the experiment of removing the chains from a few lunatics, and of treating them with kindness and consideration! Against what an embattled phalanx of obstructive prejudices, selfish indifference, and interested opposition did the humane system of treatment, the conception and realization of which were not with the people but in spite of them, win its slow way to general adoption in this country! A few earnest members of the medical profession, inspired by benevolent feeling, but little aided from without, clung to the drooping standard, and, animated with firm conviction and nerved by a sublime determination, bore it onward to triumphant victory. What a terrible outcry is now raised by an alarmed and angry public when some poor madman who has committed homicide in a paroxysm of his frenzy is permitted to pass the remainder of his unhappy life in confinement instead of being hanged forthwith! How many veritable lunatics are year after year executed in obedience to ignorant and unrighteous judgments inspired by the popular prejudice! When the superintendent or proprietor of an asylum sends a few of his patients to the seaside, to reside there for a short time, how frequently does it happen that the whole neighbourhood rises in rebellion, and hastens to protest against the outrage thought to be practised upon it! And when the protest has been unsuccessful, with what a singular consideration does this public, so eagerly censorious of those who have the difficult charge of the insane, behave with regard to them: it stares at them, points at them, perhaps follows them at a distance, as they take their walks, exactly as if they were so many wild beasts, and no longer brothers, sisters, fathers, and mothers! To be a lunatic, as public sentiment goes, is to be cut off socially from humanity. With such feeling prevalent with regard to the insane, can it be thought possible that the treatment at present sanctioned by general approbation should be the most just and humane possible? The feeling is one that cannot be justified, and the system which it inspires cannot be just. That system is the system of indiscriminate sequestration—of locking up a person in an asylum simply because he is mad.

Now I believe this practice to spring out of an unjust feeling, as already said, and to be founded on a false principle, as I shall now endeavour to show. The principle which guides the present practice is that an insane person, by the simple warrant of his insanity, should be shut up in an asylum, the exceptions being made of particular cases. This I hold to be an erroneous principle. The true principle to guide our practice should be this,—that no one, sane or insane, should ever be entirely deprived of his liberty, unless for his own protection or for the protection of society. Therefore, instead of acting on the general principle of confining the insane in asylums, and making the particular exceptions, we ought to act upon the general principle of depriving no one of his liberty, and of then making the numerous exceptions which will undoubtedly be necessary in the cases of insane persons, as in the cases of criminals. We imprison criminals in order to punish them, to reform them if possible, and to protect society from their vices: in dealing with the insane, who are suffering from disease, there can be no question of punishment, but we confine them in order to apply proper means of treatment, and to cure them, if possible; and, secondly, to protect themselves and society from their violence. If any one says that, on the admission of these principles, the practical result as regards the insane would be very much what it is now—for they would practically embrace so many of them that the exceptions would be few—I question the assertion; and I venture to assert in opposition to it, that there are many chronic and incurably insane persons, neither dangerous to themselves nor to others, who are at present confined in asylums, and who might very well be at large. But they are kept in asylums because they have been once put into them; because it is sometimes desirable that their existence should not be known to the world; because they cost less there than they would if in private houses; because they are well taken care of there; because it is heedlessly taken for granted that it is no injustice to confine them thus so long as they are mad; and for many other like reasons. But the fundamental reason which inspires all these other reasons, and without which they would want firm root, is, that the world has grown to the fashion of thinking that madmen are to be sequestrated in asylums, and cannot now, with every desire to be sincere and unbiassed, conceive the possibility of a different state of things. Even those devoted men who laboured so well to effect the abolition of restraint within asylums never dreamt of the abolition of the restraint of asylums.

I know well the objections, some fanciful and some weighty, that may be made to the doctrine just propounded. It may be said that some insane persons go on very well in asylums who would go on very badly out of them, and that it is not possible to say exactly whether an insane person is dangerous or not. The answer to that as an objection to the principle is threefold: —First, that there are some insane persons at any rate to whom it does not apply, some, however few they may be assumed to be, of whom it can be said, with as much certainty as it can be said of any experience in nature, that they are not, and never will be, dangerous to themselves or others; secondly, that it is not true that the difficulty or impossibility is so great and wide as assumed by the objection, for practically there is no more difficulty to an experienced person in deciding that a patient is not dangerous to himself or others than in deciding that he is thus dangerous, which is a thing which every physician who has to do with cases of insanity must constantly do, and which, with a few exceptions, he feels that he can do with perfect confidence; and, thirdly, that the objection might be valid if it were proposed to leave the insane not in asylums without any sort of care and control, which never was proposed, and that its whole force, therefore, lies in an assumption which is an unfounded one. Another objection to the liberation advocated will be, that the insane in private houses will not be so well cared for as they are, nor have any more comfort than they now have, in well conducted asylums. The quarter from which this objection is urged taints it with suspicion: I never heard it put forward but by those who are interested in the continuance of the present state of things. Those who make it appear to fail entirely to appreciate the strength of the passion for liberty which there is in the human breast; and as I feel most earnestly that I should infinitely prefer a garret or a cellar for lodgings, with bread and water only for food, than to be clothed in purple and fine linen and to fare sumptuously every day as a prisoner, I can well believe that all the comforts which the insane person has in his captivity are but a miserable compensation for his entire loss of liberty,—that they are petty things which weigh not at all against the mighty suffering of a life-long imprisonment. I would put it to those who lay stress on the comforts of asylums, whether they sufficiently consider the discomforts of them, apart from the imprisonment, which they are by the nature of the case. Is it not a common thing to hear from an insane person bitter complaints of the associations which he has in the asylum, and of the scenes of which he is an unwilling witness—scenes which cannot fail to occur, notwithstanding the best classification, where all sorts and conditions of madness are congregated together? What, again, can be conceived more afflicting to a man who has any intelligence and sensibility left, than the vulgar tyranny of an ignorant attendant—a tyranny which the best management cannot altogether prevent in a large asylum? And I might go on to enumerate many more of the unpreventible miseries of life in an asylum which, when superintendent of one, forced themselves painfully upon my attention, and often made me sick at heart. Those who advocate and defend the present asylum system should not overlook these disadvantages; they should not forget that there is one point of view from which they who organize, superintend, and act, regard the system, and that there is another point of view from which those who are organized, superintended, and suffer, view it. It is natural and justifiable for one who has brought into excellent order a large institution, and holds by his controlling mind its different parts in well-balanced movement, to feel proud of his work, and to contemplate with satisfaction the thorough organization of the whole; but he should surely take much heed lest that very pride of success and the strong interest which he feels blind him to its demerits. This cannot fail to be more or less so, human nature being what it is: should not a man most distrust himself when he is most satisfied with himself? Have not the most grinding tyrannies which the world has ever seen been the best organized? It is necessary to pause before accepting this argument of the comforts of asylums from those who superintend or keep them: the most sincere person cannot help being unconsciously biassed in such case. I am not ignorant, however, of the fact that there are some chronic lunatics who have been in asylums for so many years that it would be no kindness now to remove them—who have indeed so grown to the habit of their lives that it would be cruel to make any change; but I hold that to be no argument for subjecting any one else to the same treatment in order to bring about the same result: it is not the past condition but the future welfare of the insane that is the matter in hand. Human nature is so constituted that it grows to the conditions of life in which it is placed; but every one would admit it to be a poor argument in favour of unjust confinement in prisons, that a prisoner unjustly confined for years has been very unhappy when released, and has prayed to be sent back to his cell, and to the mice with which he had made friends there. Another objection will be, that if you subject a patient to systematic control outside an asylum, you do actually deprive him of his liberty quite as much as by putting him into an asylum. Suppose this were granted, it is still open to us to maintain that he would be happier amongst sane people, and under the circumstances of private life, than when surrounded by all degrees and kinds of lunacy, and subjected to the monotonous routine and oppressive regulations of an asylum. But I do not admit the justice of the objection. Let it be clearly understood that I am not now advocating the placing an insane patient alone in a cottage with one or two attendants; in such case I readily admit that he is subjected to the most odious kind of tyranny, and to a deprivation of liberty in its worst form—that he would be a thousand times better off in a well-conducted asylum, and certainly could not be worse off in the worst asylum. I am arguing distinctly in favour of placing certain chronic insane persons in private families, where after a time they become truly a part of the family, and are considered in all its arrangements, not otherwise than as a member of it afflicted with some incurable bodily disease would be. In such case the loss of liberty is by no means equal to that in an asylum, where the occasional indulgences of a certain freedom granted only serve to lighten up the present misery and to deepen the gloom of the outlook into the future.

All this, it may be said, is plausible in theory; but, practically, what is the actual condition of patients in private dwellings? Undoubtedly their condition in past years has not been what it should be; no thought has been given to it by anybody; and they have suffered from the erroneous views concerning insanity which have prevailed in the public mind. But the same thing happened in asylums at one time. They were abodes of cruel suffering to the patients; and many people, not wanting in kind feeling, thought that they must continue so by the nature of the case. But they are no longer so now; in them more enlightened views with regard to insanity arose and spread, and a great practical reform has been effected, the completeness and excellence of which have become a positive difficulty in the way of any further reform in the treatment of the insane. Is there, then, let it be demanded, any insurmountable reason why similarly enlightened views should not be inculcated on those who desire to receive single patients into their houses, and a similar beneficial reform should not be effected? That there is not is shown satisfactorily by the reports of the Scotch Deputy Commissioners in Lunacy on the condition of the pauper insane in private dwellings in Scotland.* A few years ago these persons were in a wretched state, neglected and ill-treated in many cases, and in no case having the care which their disease demanded. Now, however, all this is changed: by the powerful agency of official instruction and inspection, systematically exercised, all who have to do with them have been penetrated with more enlightened views, and the condition of their charges has accordingly been immensely improved—indeed, now leaves little or nothing to be desired. The former evils sprang not so much out of deliberate cruelty as out of want of knowledge on the part of those who had concern or part in them.

If other facts were required to strengthen the argument, I might point to the condition of the numerous Chancery patients in England, who are living in private houses. I have the best authority for saying that their condition is eminently satisfactory, and such as it is impossible it could be in the best asylum. Every patient is visited once a quarter by one of the Chancery visitors, who have the power of insisting upon his removal elsewhere, if the accommodation and treatment are not satisfactory. Nor would it be correct to attribute the success in these cases to the large amount paid for the care of Chancery patients; for, in the first place, though this is great in some cases, it is not so in others, not being indeed so great as would be demanded for their care in a good asylum; and, in the second place, the experience of the Scotch Lunacy Board shows that many pauper patients are well taken care of in private dwellings at less than one half what the cost would be in a county asylum. The question is plainly not altogether one of expense; the more it is candidly considered, the more evident it becomes that its solution lies in the promulgation of enlightened views, and in the will to realize them in practice.

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* Eighth Annual Report of the General Board of Commissioners in Lunacy for Scotland, 1866.

No one acquainted with the facts would deny that many of the single patients in England, who are not Chancery patients, are satisfactorily cared for, and are more comfortable than they would be in asylums. In the village of Hanwell, and its neighbourhood, there are several single patients living with private families, some Chancery patients, and others not, who are extremely well taken care of in every regard; what insurmountable impediment is there to that which is done successfully in Hanwell being done in any other village in England? It would be difficult to assign any such. In order to develop this system, however, it would be necessary to establish more frequent official inspection; for at present the single patients not under the jurisdiction of the Court of Chancery are only seen, on an average, once a year by the Commissioners in Lunacy; and the official policy has not hitherto been to correct, improve, and develop the system, but rather to discourage and abolish it as a permanent and increasing means of providing for the insane. When official views and practice have been modified and brought into conformity with the stream of liberal thought, as we cannot doubt that they surely will be, and when arrangements have been made for a systematic and more frequent visitation of single patients, then it cannot be doubted that the number of these will rapidly increase, to their infinite comfort, to the pressingly needed relief of our overgrown and over-crowded asylums, and to the general advantage of the community.

For the reasons adduced, I cannot but think that future progress in the improvement of the treatment of the insane lies in the direction of lessening the sequestration and increasing the liberty of them. Many chronic insane, incurable and harmless, will be allowed to spend the remaining days of their sorrowful pilgrimage in private families, having the comforts of family life, and the priceless blessing of the utmost freedom that is compatible with their proper care. The one great impediment to this reform at present undoubtedly lies in the public ignorance, the unreasoning fear, and the selfish avoidance of insanity. When knowledge is gradually made to take the place of ignorance, and familiarity banishes the horror bred of ignorance, then will a kindly feeling of sympathy for the insane unite with a just recognition of their own interests, on the part of those who receive them into their houses, to secure for them proper accommodation and good treatment; then also will asylums, instead of being vast receptacles for the concealment and safe-keeping of lunacy, acquire more and more the character of hospitals for the insane; while those who superintend them, being able to give more time and attention to the scientific study of insanity, and to the means of its treatment, will no longer be open to the reproach of forgetting their character as physicians, and degenerating into mere house-stewards, farmers, or secretaries.*

Thus much respecting the chronic insane who are harmless and incurable, and for whom the aim to have in view is to secure the most comfortable provision for the rest of their lives. It now remains to speak of the means to be adopted for the care and treatment of the insane who are deemed curable. This treatment is moral and medical, the two methods being properly combined in every case. Again, it should be specially directed to the character and circumstances of the individual case; it is necessary to penetrate the individual character, in order to influence it beneficially by moral means, and to investigate carefully the concurrence of conditions that have issued in insanity, in order, so far as possible, to remove them. Not the least of the evils of our present monstrous asylums is the entire impossibility of anything like individual treatment in them. It would not be putting the matter fairly to point out the absurdity of two medical men affecting to treat really seven or eight hundred lunatics in an asylum, because the majority of them assuredly do not require any medical treatment; but it is perfectly fair to call attention to the uncertain chances of satisfactory treatment which the small curable minority have under such circumstances. To the medical officer these are not so many *individuals*, having particular characters and particular bodily dispositions, with which he is thoroughly acquainted, but they are apt to become so many lunatics, whom he has to inspect as he goes his round of the establishment, as he inspects the baths and the beds; and the only person perhaps really aware that each of them has an individual character, is the attendant. Herein lies a reason why the best possible treatment in some instances undoubtedly is to remove a patient from an asylum to the care of his own friends; he may then recover, as the Positive philosopher, Comte, recovered, and as others have recovered, though there seemed every likelihood of their becoming permanent lunatics in the asylum. Indeed, I cannot help feeling, from my experience, that one effect of asylums is to make some permanent lunatics: continually living in the atmosphere of the worst lunacy, certain patients seem to become impregnated with its baneful inspiration, and after a time sink to the situation. And I can certainly call to mind more than one instance in which I thoroughly believe that the removal of a patient from an asylum was the salvation of his reason.

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* Of this reform my friend Baron Mundy, M.D. has long been the earnest and unwearied advocate, having devoted to it, in a purely philanthropic spirit, many years of energy, and a great part of his income.

In dealing with insanity it is before all things necessary that treatment should begin early, before the habit of a definite morbid action has been fixed in the mental organization. There is reason to think that if the first obscure threatenings were duly appreciated, and the proper remedial means at once adopted, many cases of insanity might be arrested at the outset. But the mischief is that a case of insanity hardly ever comes under the care of those specially qualified by their experience to treat it until the disease has been firmly established, and the hope of recovery save from gradual and protracted means is gone in some cases, and all hope gone in others. When the disease is well established, our treatment must not be rashly vigorous and energetic, with the aim of effecting any sudden revolution, but rather patient and systematic, in the hope of a gradual change for the better. While in other diseases time is reckoned by hours and days, it must in insanity be reckoned by weeks and months.

Moral Treatment.—"To remove the patient from the midst of those circumstances under which insanity has been produced must be the first aim of treatment. There is always extreme difficulty in treating satisfactorily an insane person in his own house amongst his own kindred, where he has been accustomed to exercise authority, or to exact attention, and where he continually finds new occasions for outbreaks of anger or fresh food for his delusions. An entire change in the surroundings will sometimes of itself lead to his recovery: if the patient is melancholic, he no longer receives the impressions of those whom having most loved when well he now most mistrusts, or concerning whom he grieves that his affections are so much changed; if he is maniacal, he is not specially irritated by the opposition of those to whose acquiescence he has been accustomed, nor encouraged by their submission to his whims and their indulgence of his follies." Travelling may be recommended in the early stages to those who can afford it, in order to secure change of place and scene and a variety of new impressions; or if the patient is not fit to travel, he should, in most cases, be removed from his own home to another residence, where he may be placed under the firm and judicious control of persons of some cultivation, and where he may have systematic medical treatment. The practice of placing insane persons alone in a cottage under the control of one or two vulgar attendants is certainly to be condemned except as a temporary expedient: those who are permitted to take on them the very responsible charge of controlling those who are unable to take care of themselves should assuredly have some social stake, and be in a position to lose something by evil behaviour. If neither of the above courses can be taken, or if the patient is furious, or desperately suicidal, or persistently refuses food, it will be necessary to send him to a suitable asylum. And in choosing an asylum the main guiding principle should be, other things being equal, to select one in which medical treatment is a real feature.

No doubt the change by which asylums, formerly in the hands of non-professional men, who kept them, as hotels are kept, simply for profit, have been placed in the hands of medical men, has been a beneficial change; but it has not been without corresponding detriment, nor has it exhausted the possibilities of reform. There is not in a medical diploma any miraculous talismanic power capable of changing human nature, and of preserving it from the frailties incident to its pilgrimage through life. And the inevitable tendency of making any one the medical proprietor and manager of a large establishment is to absorb his attention and energy in the economical management of it, to the neglect of his function as physician in a hospital for the treatment of disease: the medical diploma is apt to become a mere form, to be obtained, in the least troublesome manner, as an essential prerequisite to getting a licence to keep lunatics, while the scientific study and the scientific treatment of insanity are not thought of at all. It may justly admit of question whether the medical profession has gained anything by a change that has had such a result, while it hardly admits of doubt that the public has not gained as much as it might have done. I cannot help thinking that it might be to the advantage of the public and the medical profession if there were no such practice as now finds exclusive favour in England of making medical men the proprietors of asylums. Of course it is most necessary to insist on proper medical supervision and proper medical treatment, but is there not sufficient reason to believe that these might be equally well, if not better, secured by dissociating the medical element entirely from all questions of profit and loss, and allowing it the unfettered exercise of its healing function? It would be a vast comfort to physicians practising in lunacy, who are now forced to become proprietors of asylums in order to have a field for practice. It would be a gain also to the public; for eminent and accomplished physicians would then engage in this branch of practice who now avoid it, because it involves so many disagreeable necessities.

Let who will keep the asylums, it is necessary that they exist. To put an insane patient under such restraint is indispensable in some cases; it may be the only way of adequately exercising for him that control which he cannot exercise for himself, or the best way of so exercising it as to promote early recovery; and to let him distinctly understand that this is legally done will of itself have a beneficial effect. There should be no secrecy, no deception about the matter, but all should be done openly and firmly, in the spirit in which an act of obedience is inculcated upon a child, and in any case inflexibly insisted upon. The melancholic who finds himself in an asylum has a real grief to alternate with or perhaps take the place of his fancied affliction, and the maniacal patient, feeling his wild spirit of exultation to be rudely checked by the influence of a systematic control, will often have more sober reflections aroused.

The patient having been removed from those influences which have conspired to the production of the disease, and now tend to keep it up, and having been made to recognise from without a control which he cannot exercise from within, it remains to strive patiently and persistently by every inducement to arouse him from his self-brooding or self-exaltation, and to engage his attention in matters external—to make him step out of himself. This is best done by interesting him in some occupation, or in a variety of amusements; and it will be done the more easily now that the surroundings have been entirely changed. The activity of the morbid thoughts and feelings subsiding in new relations and under new impressions, more healthy feelings may be gradually awakened; and the activity of healthy thought and feeling will not fail in its turn further to favour the decay of morbid feeling. If there is some fixed delusion, it will do no good to enter upon any systematic argument against it; there would be almost as much hope of an argument against the east wind or against a convulsion; but by engaging the mind in other thoughts as much as possible, and thus substituting a healthy energy for the morbid energy, the force of the delusion will be most likely to abate, and finally to die out. But, although it is of no avail to talk against a delusion, it is important to avoid assenting to it: by quiet dissent or a mild expression of incredulity when it is mentioned, the patient should be made to understand clearly that he is in a minority of one, and that, though a person in a minority of one may perchance be a genius in advance of the rest of mankind, it is infinitely more likely that he is a madman far behind it.

Medical Treatment.—A truly scientific treatment will be grounded upon the removal of those bodily conditions which appear to have acted as causes of the disease, and to be keeping it up, and upon the general improvement of nutrition. The morbid sensations in different parts of the body, which are so commonly experienced in insanity, often spring from some real bodily disorder, and tend to sustain the delusion or other derangement of thought. They should obtain the careful attention which they deserve, for bodily disease is not always detected easily, and is sometimes overlooked, in the insane; the usual symptoms being very much masked, and they, like animals, often making no intelligent complaint. It is necessary, therefore, to pay particular attention to the physical signs of disease: there may be no cough, no expectoration, when the stethoscope or the thermometer reveals advancing phthisis.

General blood-letting is now abandoned in the most acute and seemingly sthenic insanity, as not merely useless but as positively pernicious. It is admitted that convulsion of mind does not mean strength of mind, and is not likely to be cured by draining off the life that is in the blood; violent symptoms may certainly be reduced for a time by blood-letting, but the disease is very likely to become chronic, and to pass into dementia. In some cases, in which there appears to be great determination of blood to the brain, a local abstraction of blood by means of leeches or cupping may be useful; it should not be done with any view of reducing the general strength, but with the view of withdrawing blood from the overloaded vessels, and of thus affording the opportunity of rest to the struggling and suffering nerve element. In such case the aim is to imitate nature, which diminishes the quantity of blood in the brain during sleep.

The continued application of cold to the head by means of a douche pipe, or a shower-bath, or by pouring cold water upon it, while the patient lies in a warm bath, is sometimes successful in calming excitement and in procuring sleep in acute insanity of a maniacal type. The warm bath alone, taken for about half an hour, has a decidedly soothing effect; and some have thought its efficacy to be increased by the addition of a few handfuls of coarse mustard, whereby a general redness of the surface of the body is produced. In France the warm bath has been used for eight or ten hours at a time with professedly good results; and Leidesdorf of Vienna has used for three or four hours, and in many cases with a marked tranquillizing effect, a bath, constructed by Professor Hebra, in which patients may be kept night and day at a definite temperature. It is obviously necessary to avoid any such use of the bath where the pulse is very feeble, and where there is anything like commencing paralysis; and it can be of no avail in cases of chronic insanity.

The shower-bath or the cold douche may be administered with advantage in some cases of melancholia where reaction does not fail to take place properly afterwards, and in cases of chronic insanity, with the purpose of rousing the patient and of giving tone to the system; but its use should not be continued for more than three minutes, and it should not be with the aim of producing any special effect, but on the general principle of improving the bodily health. The advocates of the Turkish bath have vaunted its beneficial effects in insanity, as in every other disease; but no discrimination of the cases in which it is useful has hitherto been made. I should be disposed to put more faith in the use of the Russian vapour-bath, which might not improbably be of real service in some cases of mania and melancholia, where the skin is dry and harsh, and its secretion disordered. Packing in the wet sheet, after the hydropathic fashion, and as recommended by Dr. Robertson of the Sussex Asylum, is undoubtedly a useful remedial means in some cases of acute excitement; it has not only a soothing effect of itself, so that the patient will sometimes go to sleep in it, but, by keeping a restless and excited patient quiet, it enables sedatives to take effect when they would be perfectly useless if no such means were used. On one occasion I was roused hastily to see a girl who had suddenly been attacked with acute hysterical mania, to the great consternation of the whole household, and to the despair of the medical attendant, who could not get her to take anything, or to remain quiet for a moment. She had torn her night-dress to shreds, was tossing about on her bed ceaselessly, and was quite incoherent. She was immediately packed in the wet sheet, and a cloth dipped in cold water applied to the head; and when this had been done, she took without any difficulty a dram of tincture of henbane, and after a short time slept. In the morning all excitement had gone, though she was confused in mind, and in a few days she was quite recovered. The wet sheet should not be used for more than three hours at a time, and should be changed once during that time. Thus it has its true character as a means of medical treatment, and is not abused for purposes of mechanical restraint.

Counter-irritants are not much used in insanity. Schroeder van der Kolk, however, thought he had seen beneficial results follow the application of strong tartar emetic ointment, or of a blister to the shaven scalp; and Dr. Bucknill recommends croton oil to be rubbed into the scalp in the passage of acute into chronic insanity or into dementia, and in chronic melancholy with delusion. I have seen in one case a wonderful temporary effect produced by a blister to the nape of the neck: a young lady who had appeared demented for months, and who had not spoken during that time, woke up out of her usual stupor the day after a blister had been applied, and spoke as rationally as she ever did in her life; next day, however, she was much excited, and inclined to be violent, and after this subsided into her mute stupor again. The same experiment was repeated on another occasion with a similar result, save that her excitement and violence were much greater than on the first occasion. Notwithstanding the marvellous effect of the blister in this instance, an effect which might well seem to indicate a valuable therapeutical remedy, I have not been able to satisfy myself of much permanent good ever having been done by blisters or setons in insanity. If they are useful, they are most likely to do good in melancholia with stupor and in acute dementia.

"After errors of digestion and secretion have been duly attended to, the diet of the insane should be good; and it will be desirable in most chronic cases and in many acute cases, to allow a liberal use of wine. There can be little doubt that an attack of insanity might sometimes be warded off by a generous diet and a free use of wine at a sufficiently early stage. It is, at any rate, a truth worthy of all acceptation, that energetic antiphlogistic treatment in the course of insanity is energetic mischief. Leeches may be applied to the head, and a patient may be kept on low diet, in order to subdue maniacal excitement, without any other result than an increase of the excitement with the increase of exhaustion, and the most active purges may be given, and given in vain, to overcome an obstinate constipation, when brandy and beef-tea, reducing exhaustion, will subdue excitement, and a simple enema will produce full action of the bowels. Active purgation, once so much favoured, is now quite eschewed in all forms of insanity. The bowels may often be regulated by dietetic means; and, if a purge is needed, a dose of aloes, rhubarb, confection of senna, or castor-oil, will answer every purpose; a moderate dose of the latter sometimes succeeding where the most drastic purgatives fail." The present bodily state of the patient, and the history of the causation of his malady, must be weighed in determining whether wine is to be given or not in the most acute stage; in cases of a sthenic type it may be desirable to do little more than wait patiently until the fury of the storm has passed, and then freely to give support.

Coming now to the more purely medicinal treatment of insanity, we may speak first of the virtues of opium. This drug is particularly useful in that state of mental hyperæsthesia which so often precedes an outbreak of insanity: when the mental tone is so changed that almost every impression is felt as painful, then opium, freely given, produces beneficial effects. When the acute symptoms of mania have subsided, and a gloomy and morose mood of mind comes on, which in some instances heralds recovery, but in other cases a recurrence of the attack, then is a favourable time for the judicious administration of opium. It is certainly useful, but has undoubtedly been over-praised, in cases of simple melancholia, when it should be given in doses of one or even two grains twice a day, and continued steadily for weeks, notwithstanding an apparent want of success at first. If it produces constipation, each dose may be combined with a grain of aloine, or with two or three grains of the extract of aloes, or with a quarter of a grain of podophyllin. Where there is a fixed delusion of some standing, opium is of no use except as an occasional expedient for procuring sleep. It may be given with benefit in the mania caused by intemperance, in the mania or delirium of nervous exhaustion, and in puerperal mania; but it is not of the slightest use in acute idiopathic mania, in melancholia with stupor, or in the attacks of acute excitement that occur in the course of chronic mania and general paralysis.

The subcutaneous injection of morphia is a valuable expedient to have recourse to where there is a refusal to take medicine, and frequently operates more certainly, quickly, and effectually than opium taken by the mouth. Not more than a quarter of a grain should be injected to begin with, the quantity being subsequently increased, if necessary. It is important, however, to bear clearly in mind that neither opium by the mouth, nor morphia hypodermically injected, will avail to quench the fury of acute mania, and that successive injections of morphia, though followed by brief snatches of fitful sleep, have been followed also by fatal collapse or coma.

In cases of great excitement, maniacal or melancholic, where it is advisable to give opium, large doses of digitalis sometimes produce good effects in tranquillizing the patient. The excitement abates, and the pulse, falling in frequency, may, by repeating the dose, be kept for some time at a standard below the average. In the attacks of excitement which occur in the course of general paralysis the effects of digitalis are excellent; it had better be given in doses of half a drachm of the tincture repeated two or three times a day than in doses of one drachm or two drachms, as some have advocated. Notwithstanding the present fashion of large doses, and the disbelief in the cumulative action of digitalis, I hold it to be the duty of a good physician to be exceedingly careful in his administration of so uncertain a drug. I have certainly known an acute maniacal patient to drop down and die in collapse, after taking repeated large doses of digitalis, whether owing to the mania or to the digitalis must remain uncertain; and I believe that, though a patient who has taken large doses of digitalis may be safe while he is lying down, he is sometimes in no small danger of fatal collapse if he starts up, or runs about in an excited manner.

Hyoscyamus is much safer than digitalis; it is of no use in small doses, but, in doses of a drachm or two drachms of the tincture, it is a valuable sedative in insanity. Hydrocyanic acid, in large doses, has been praised as being of wonderful efficacy, but it has no specific virtue, and it appears to do good only where there is some disorder of the stomach, not otherwise than as it does good where there is no insanity. Bromide of potassium certainly appears to produce good effects in some cases of insanity, but in others, apparently similar, it appears to have no effect whatever. I have tried it in cases of regularly recurrent mania, moved to the experiment by the knowledge of its good effects in epilepsy, with which recurrent mania always seems to me to have some close relation or resemblance; and sometimes I have thought it do good and sometimes to be quite useless. Further trial of it, care being taken that it is not adulterated, is certainly desirable. "Tartar emetic will often calm for a time the most furious maniac through the prostration which it produces, but it does no permanent good, and its employment for such purpose is rather a relic of the old system of quieting a patient by some violent means or other short of actually killing him. If mercury be ever useful, and not mischievous, in the treatment of insanity, it is when given in small doses of the bichloride in cases that are becoming chronic, or where there is a suspicion of syphilis. To administer mercury systematically in general paralysis, as has been done, is as untenable in theory as it is undoubtedly pernicious in practice."

"In all those cases of insanity in which tonics seem to be demanded by the state of the bodily health—and they are the majority of cases at one period or other of their course—iron and quinine may be given; and one of the best ways of giving them is in a mixture containing quinine, the tincture of the sesquichloride of iron, and chloric ether. In some cases it happens that an uncontrollable diarrhœa sets in and carries the patient off, nothing availing to check it: acetate of lead with opium and enemata of starch and laudanum are most likely to be useful."

"When insanity has become chronic, or when fixed delusions are established, there is small hope of special benefit from drugs. The general health being duly attended to, a systematic moral treatment will be best adapted to restore health of mind. Where there is persistent refusal of food, it must never be allowed to continue so as to endanger the bodily health; and if persuasion entirely fail, then the stomach-pump must be used to administer food. Those who are suicidal should be carefully watched at all times, and especially so on getting up in the morning, when the thoughts are gloomy, and the desperate impulse is apt to surprise and overpower them. The monomaniac, who has delusions that he is watched continually, or otherwise persecuted, must always be deemed dangerous to others; for at any time he may become so impatient of his sufferings as to make a fatal attack upon his fancied persecutor. Those who suffer from moral insanity are often very troublesome to deal with satisfactorily; but it will be worth while always to remember that one unequal to the responsibilities and duties of the social position in which he was born may not on that account be unequal to the relations of a much lower social stratum."* It is not because a person insists upon degrading or ruining himself that it is justifiable to deprive him of his liberty as a lunatic.

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* The quotations are from the Author's article on "Insanity," already referred to.

THE END.

THE

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